

# CARNIVOROUS PLANT NEWSLETTER

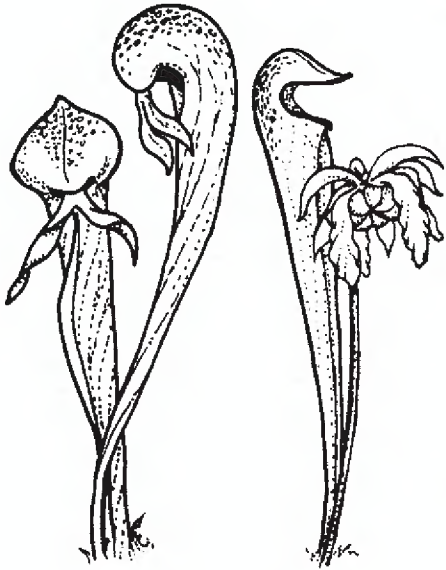
Journal of the International Carnivorous Plant Society

Volume 52, No. 1

March 2023







# CARNIVOROUS PLANT NEWSLETTER

Journal of the International  
Carnivorous Plant Society  
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Volume 52, Number 1  
March 2023



**Front Cover:** Larry Mellichamp tending to *Sarracenia* at the McMillan Greenhouses of the University of North Carolina at Charlotte. Undated photo. Article on page 4.

**Back Cover:** Authors Tan Hong Liang (left) and Gideon Lim holding upper pitchers of *Nepenthes berbulu* at its type locality in Peninsular Malaysia, February 2020. Composite of photos by G. Lim and H.L. Tan. Article on page 15.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

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## THOMAS LAWRENCE MELLICHAMP, “DR. M”

October 4, 1948 – September 12, 2022

<https://doi.org/10.55360/cpn521.lm999>

AUDREY MELLICHAMP • Charlotte • North Carolina • USA

Our community has lost its ultimate “Plant Whisperer”, Dr. Larry Mellichamp. botanist, teacher, mentor, author, and creator (Front Cover). Larry had a phenomenal knowledge of the lives and growth of plants. He broke ground at the highest levels of botanical knowledge, and yet, also among the humblest of home gardens. He could convey to anyone which plant should go to which site and what that plant needed to flourish. Everything he did in his life led to this ability.

As a child he was always digging in the dirt – even tasting it! As a teenager, on his uncle’s farm in South Carolina, he worked in the crops, cutting and hanging tobacco. At his grandmother’s home in Lamar, South Carolina, he helped her with arranging flowers. Bama was the local florist, and her side yard had interesting and unusual plants. Larry was influenced by his Daddy who was an organic gardener before it was “a thing”.

Larry is a local boy (made good), though he was born in Pittsburgh, Pennsylvania, when his father was in art school. Back in Charlotte, he played for countless hours in the neighborhood pond, losing himself in observing wildlife and collecting water samples. He had a microscope at home and explored the hidden micro-world within that pond. After attending East Mecklenburg High School, he attended the new University of North Carolina at Charlotte, graduating with a Bachelor’s degree in the second graduating class. At UNC Charlotte he was quickly recognized by his biology professors as someone special, and he was given responsibility for the small teaching greenhouse and planted some of the first plants in what would later become the Botanical Gardens. He took field trips to the mountains and to the Green Swamp, where he first acquainted himself with carnivorous plants. This was the spark of the beginning of a life’s work with these amazing plants.

From there he went north to the University of Michigan in Ann Arbor for his PhD in Biology, working with the renowned fern expert, Dr. Herb Wagner. By observing the dynamic Dr. Wagner, Larry’s teaching skills came naturally, and he shone in leading lab classes and was given the opportunity to teach continuing education classes, as well. He won the graduate student of the year award and was considered the go-to teaching assistant in his department.

On weekends there in Ann Arbor, he “lived” at the Botanical Gardens, learning behind the scenes with their gardeners, giving lessons and tours of the conservatory, adding layer upon layer to his understanding of the world of plants. At the University of Michigan, he met his lifelong partner of 48 years, Audrey. They created a unique team and shared their growing passion for the natural world with students and other adults. They explored the United States and the world together. Their love blossomed from officemates through lab partners to summers at the University of Michigan Biological Station in Pellston, Michigan. Exploring the dunes, bogs, and the entire North Woods was like heaven to them.

Fate and talent conspired to bring Larry back to Charlotte. In 1976, he was offered an assistant professor position at his alma mater, UNC Charlotte. Here, over 39 years, he would become so much more than a talented professor and beloved teacher. Here he would take the reins of a ten-acre campus garden and transform it into a living laboratory, a beautiful garden, an incredibly diverse collection of plants from the Carolinas and around the world, and a green heart from which botanists, teachers, gardeners, public leaders, and citizen naturalists would grow and go on to influence countless others.



Larry was a generous, curious, and engaged teacher, taking time to talk to and guide his students in their lives. He was not just a mentor, he was “the mentor’s mentor”. He could talk with anyone – young, old, rich, poor. No question, no matter how many times he had heard it was too small, and many times he responded with “great question!”

Throughout his life he traveled the world to see rare plants, visiting Costa Rica, Mexico, Borneo, South Africa, Australia, China, and Madagascar (with daughter, Suzanne). Not many naturalists had his uncanny knack to find rare plants in the wild. He knew where they should live – their habitat and their associates, and what lived with them. Not only a respected field botanist, he also saw the potential of particular wild plants to grace our gardens. He shared these plants with nurserymen and many are now garden favorites. He had the vision of cross-breeding and promoting the cultivation of carnivorous *Sarracenia* pitcher plants and spent years of solo and collaborative work to bring it to fruition. He was the first to patent a *Sarracenia* hybrid ‘Redbug’.

As the Director of the Botanical Gardens at UNC Charlotte, Larry brought the world of plants to people. His vision and drive to grow and share rare and fascinating plants, resulted in many “firsts” for Charlotte: a diverse orchid collection of species and hybrids, South African (and other desert) succulent room, carnivorous plant bogs, a dinosaur’s garden with a life-size *Deinonychus* sculpture, and the first blooming of a Titan Arum in the Carolinas. His expertise ran both broad and deep. He was a central figure in the North Carolina Native Plant Society and he understood the importance of our native flora for everyone, not just experts. Leading his Botanical Garden team, he created a first-of-its-kind native plant garden specifically designed for homeowners, and a native plants certificate program to educate and inspire the public.

His popular books and talks further extended his reach and influence: *The Winter Garden*, *Bizarre Botanicals*, *Native Plants of the Southeast*, and *The Southeast Native Plant Primer*. As a professional taxonomist, he wrote the scientific treatises of dozens of species for the *Flora of North America*. He worked tirelessly for what he loved and his efforts did not go unrecognized. He was most proud of winning the Association of Southeastern Biologists Teaching award, the Tom Dowd Award from the Cullowhee Native Plant Conference, the International Carnivorous Society Lifetime Achievement award, and the prestigious *Flora Caroliniana* award given for enthusiasm and service to the preservation, restoration, and appreciation of the natural world.

Larry loved and appreciated his family and was most proud of his daughter, Suzanne, and her ability to create natural images in clay. Her calla lily and magnolia flower pieces were cherished by him.

At 73, Larry lived almost three years beyond his “expiration date” for his diagnosis of bile duct cancer. He is preceded in death by his father, William “Bill” Louis Mellichamp and his mother, Martha Thomas Mellichamp. He leaves his wife, Audrey, and daughter Suzanne; sister Judy (children Jason, Jenna), brother-in-law Jerry, and sister Joanne (children April & Sarah).

A public memorial service was held October 30, 2022 at the UNC Charlotte Botanical Gardens.

Words spoken at the Memorial of Dr. Larry Mellichamp, October 30, 2022

PAULA GROSS • Former Assistant Director of the UNC Charlotte Botanical Gardens • Charlotte • North Carolina • USA

Nature, music, community.

Movement, change, light and color.

Wonder, memories, grief.

Reverence, transformation, and Life in all its autumnal glory.



What a gift to be present – to be together – for these moments. Thank you all for being here, for your presence, to honor the life of Larry Mellichamp and to hold his family and his community in our hearts. I especially thank Amy and the entire staff of the Botanical Gardens for the work, care, planning, and generosity that went into bringing Larry's vision of this day into being.

Most of you know me – I'm Paula Gross. I worked with Larry, here at the Botanical Gardens, for 17 years. He was a mentor, a collaborator, a catalyst for knowledge and growth, and a friend. Many of you have stood here before, in the Mellichamp native terrace – or in the greenhouse or the Glen with Larry, in person. Observing, discovering, questioning, weeding, evaluating, learning, talking, listening – definitely listening – growing.

This living, breathing land holds his legacy and his spirit. He is very much here. Will always be here. And at the same time, a garden is bigger than any one person – even someone as indomitable as Larry.

Larry was creating to his last days. When he was visioning this very day, and describing in detail to myself and others – the time of year, the paths, the words, the music – he was gifting himself and gifting us this experience. Curating and distilling in the garden, once again. He requested there be few words, wanting the experience of the garden to form meaning for each of us, as a lovingly crafted garden is wont to do.

In his physical absence, we bring our presence – alive and grateful for the beauty and wonder of this garden and for each other. Gardeners, all – in one form or another. And Larry never met a person he couldn't or wouldn't speak plants or garden to. He was both deeply focused in the details of his own world and ready to share it with you. Both impulsive and cautious. Witty, quick with an answer, but also evolving. Both down-to-earth, and somehow a touch above. The ideas never ceased and he was fortunate to have the support of his family, co-workers, and friends to do what he loved. And we were fortunate, in turn.

Larry never tired of learning, he never tired of the fascination of the natural world, never tired of words – his own – or others. Three lifetimes wouldn't have been enough to slake his thirst for these experiences. But all bodies do tire, eventually. Even if too soon by our estimation and desire.

So, with open hearts, we may grieve. With the support of all our senses and with each other, we may grieve his passing.

Larry taught, shared and inspired for lifetimes of resonance. Threads of his being are interwoven into mine – and each of yours in varying colors, textures, and weight. And WE also share threads of ourselves and our passions with others. And in this way, the fabric strengthens, and grows.

The fabric – the Web-of-Life. This was a recurring theme in many of Larry and my deeper conversations. Especially in botanical discussions, we would often end up at the web-of-life. And I feel it now. And it feels right.

In this cathedral of cellulosic stained-glass. In this season of unveiling, of shedding and recycling, of letting go in a moment of beauty. . . Could there be a more glorious and graceful release?

I share my wishes offered to Larry 5 years ago . . . and to all of you now:

May your branches always reach upward,  
May your leaves be reticulate,  
May your stomata remain open,  
And may your roots always grow beyond the dripline.  
With love, honor, and gratitude for your life. Peace to you, Larry.  
Peace to us all.



CARSON TREXLER • Portland • Oregon • USA

I have learned much of Larry Mellichamp since our reunion in 2018 at Santa Rosa. He was never one to put on airs, but if he did, they were drier than the Sahara, engineered to divert attention away from whatever laudable quality of his may be at issue. Larry's internality was not easy to observe. Though he was not evasive, he was shrouded in a profound and deflective sense of professionalism that itself was curated from a very young age. He could bedazzle you with a cloud of puns, draw your attention to something else, keeping you an arm's length away from his heart. But still he was guided by his heart to care for you. He was an experimenter and cultivator of methods of education, speech, and wit. He was deft with an idea as a magician with a card; educational meme craft was his job and was his nature. One can see it in his humor. He was full of jokes, as his humor came about from understanding or tending to the attention-grabbing aspects of things. This was how he came to understand the real-time needs



Carson Trexler & Larry Mellichamp, May 2022.  
Photo by Audrey Mellichamp.

of students and the ear of his audience; how he crafted his verbal cadence; how he described a plant; how he would emphasize differently various attributes across different permutations of the same rote discourse; how his Botanical Gardens needed to grow; how a student needed to learn. Larry's keen observations were bread and butter to the work of his endless ministrations as a leader and crafter of educated people. His botanic expertise was a mere stage, a context for the brilliant machinery of a man who could have succeeded in almost any domain. He chose the herbarium and garden and the companionship of students and friends to the company of other executives, researchers, or famous names.

We were lucky to have him. I was lucky to know him. And because he needed to open up in his final, weakened years, I think he was also happy to know me.

I think he perhaps did imagine himself being remembered for all the achievements he incurred, to be recorded like some ancient stele-inscribed catalogue, to be buried somewhere for some archeologist to discover later on. We already have his CV. While prodigious, it is not especially important. Larry, a memorial stele does not make a man. The exertion and content of your character has taken you farther and to far better places than the thrust of your achievements could ever hope to have traveled. I think you knew that and wanted someone to notice, you wanted others to know that *you found out* that you were a *good person*. You were loved.

You can act good all you want for your entire life and remain unnoticed, even by your closest friends, until someone actively tries to find out what the good is that you are doing. This requires



sensitivity, it takes a silent kind of energy to listen. It is each our responsibility to look into the motives of others to understand them in a social economy. When we do this, we necessarily risk discovering things we did not want to know, but in order to understand the goodness in people we must walk with all their angels and all of their demons – all feathers flecked with grey.

It is entirely on oneself to be balanced enough to see the good in people, because, *carpe diem*, nobody else is going to tell you that it's time for you to live. So, for three years, while Larry slowly weakened from that cancer, I stayed balanced and listened and listened and listened. I listened, hours and days on end, for three years, because it was time for both of us to live.

I didn't imagine at first that behind Larry's professional façade was anything waiting to be discovered. But his eagerness to talk to me spoke volumes and betrayed his habitual professionalism. When people want to talk to you – just talk, nothing special – it means they want you to look into their heart. This is true for dates, friends, old married couples, homeless folks crying on the street, even between students and professors. He wanted to finally be seen before he passed. We got there, it breaks my heart to say it, three weeks before he died, when he said he wanted to learn more about me. I knew we had come full circle then. But circumambulating that full circle was the whole point all along, and I'm so, so happy to say that we didn't forget to dance our whole way 'round.

He wasn't simple, he was shrewd and brilliant and didn't care to prove it. He balanced fire and oil amongst friends and in academia, squeezed water from stones, augured and drew miracles out of bare land in hidden, unwanted places, and kindled the fire of the young. As he was dying, he strove to teach me the magic of botany, and now I cast those spells.

He was cantankerous, sometimes rude, abrupt, extremely obstinate, and very bossy. Stuck in his ways. Very traditionalist. He was very spiritual, perhaps not scientifically, and incredibly insightful, and only ever shared his insight with those who deserved it – not always those who could see it, or even who yet could achieve it on their own. His vision into wonderful things he would share with people who did not have the means to get there on their own. He saw majesty in his way of life, I know, and perhaps thought very highly of it. I think he did so elegantly.

He was a sweetheart, and he was loved very much. I made many oblique approaches to the doorstep of his heart and he deflected each one. Eventually I was invited in. We could see each other's designs. I couldn't see everything but I didn't need to.

He got very weak as the end came nearer. Speech got repetitive. His attitude had less brio and more brimstone. That humor though. It never left.

He said he poured everything he had into me. We both know he didn't mean his botany. He poured his soul out for things he cared about and *never asked, he never asked anyone* to notice him for it, and that's precisely why I loved him so much. It's precisely the point I want to make:

Larry Mellichamp loved what he did so much that he never asked anyone to notice. I want you all to know that he deserves all your love, because he always put his funny, happy heart first and never asked for anything in return.

### Missing Larry

TOM DIGGS • Biology • University of North Georgia • Gainesville • Georgia • USA

I had the privilege of guiding Larry around the dolomite glades of Bibb County, Alabama in 2015. I'll never forget that experience, as he took in the wonder of the rich biodiversity surrounding him. I remember him turning to the students who accompanied us and almost wistfully commenting, "I hope you realize what a special place you're looking at." It stuck with those students – they could tell what a deeply committed naturalist and scientist Larry was. We'll all miss him.



## Remembering Larry Mellichamp

PETER D'AMATO • Guerneville • California • USA

I was rather upset hearing of Larry Mellichamp's death and writing in my journal when the double 4.4 quake hit.

One thing I miss is Larry's humor. He always began his slide shows with a photo of a traffic stop sign with bullet holes in it. "This is how you know you're in the South...", he would joke.

In late summer of 1999, I gave a talk at the University of North Carolina at Chapel Hill where the late Rob Gardner ran the botanical gardens and was of course an associate of Larry, who was from the Charlotte branch of UNC. They had installed some beautiful raised bog gardens photographed on page 50 of my book *The Savage Garden*, which Rob had sent me previous to its publication. We then left on a memorable field trip down to the Wilmington area.

Hurricane Floyd had just devastated the coast there a couple of weeks before our visit. It took half an hour to find our hotel because all the big signs on "hotel row" in Wilmington had blown over, and much was flooded. Larry and Rob showed me how the tidal surge swept in from the coast TEN miles! *Sarracenia* were in twelve inches of water; how they survived the salt was amazing, probably due to the heavy freshwater rains that followed.

They showed me several areas where flytraps were growing on the sides of highways in sand next to overflowing rivers. Tire tracks crisscrossed the plants, it was quite a sight to behold. Mosquitoes ate me alive! They showed me how red fire ants built domed nests above the normal water levels, giving flytraps a drier place to grow and eat them! Rob suffered from health problems and used braces to walk and had to avoid the more vigorous walks in the soaked areas, but Larry enthusiastically led the way.

He was a botanical genius in my opinion, not just about the carnivores, but all the fascinating plant life in the South, and how devastating habitat change was occurring as the long-leaf pine forests where CP grew in the grassy savannahs were being replaced by slash pines for lumber. It was a memorable trip with two of the experts on native CP of the Carolinas, which were unfortunately disappearing too rapidly.

Larry visited California Carnivores and gave fun slide shows and loved the field trip Damon organized to see *Darlingtonia* in the wild, during the 2018 conference in Sonoma County, and puzzled over *Utricularia* we grew in water trays at the nursery. His *Sarracenia* hybrids were and are memorable. He named a number of them after CP experts he admired, like Fred Case, and had taxonomy disagreements with Don Schnell but not hostile ones.

I loved being with Larry, his southern humor was infectious and his knowledge awe-inspiring. I'm so sorry to know he is gone.







UPDATE OF  
13TH ICPS  
CONFERENCE  
HIMEJI, JAPAN

MAY 26–28, 2023

<https://doi.org/10.55360/cpn521.jc526>

The 13th ICPS Conference will be held in Himeji Japan in May 2023 after being postponed 3 times due to the COVID-19 epidemic.

Himeji is located in the southwestern part of Hyogo Prefecture and has the 2nd largest population in the prefecture. It can be accessed from Kansai International Airport (KIX) by JR limited express trains changing trains at Shin-Osaka in about 1 hour and 45 minutes. From Narita International Airport (NRA), it will take about 5 hours or 5 hours and 50 minutes by JR Kaisoku train and JR Shinkansen (Nozomi or Hikari, respectively) changing trains at Tokyo Station.

There are 3 major cities near Himeji, i.e., Kobe, Osaka, and Kyoto, which can be accessed from Himeji in 41, 64, and 94 minutes, respectively, by JR Shinkaisoku (special rapid service) train. You may want to visit these cities as well.

The 3-day conference will be held at the Middle Hall on the 3rd floor of Himeji Citizens Hall which is located a 14-minute walk from Himeji Station. The plant exhibitions and sales booths are to be set up in Meeting Room 6 on the 4th floor of the same building and will be for open for public during the 3-day conference (from 12:00 on May 26).

There are about 20 hotels within walking distance from Himeji Citizens Hall. Tourist information center is located at JR Himeji Station center concourse northwest side.



When you arrive at JR Himeji Station and walk north, you will be surprised to see the World Heritage Himeji Castle right in front of you. Most of the hotels are located in walking distance from the station, but you can take a taxi from the station, if you want.

You can enjoy variety of meals from Japanese (sushi, tempura) to French, Italian, Chinese, etc. for your dinner. Please ask the concierge/ staff of your hotel for restaurant information.

We expect many presentations in the conference of diverse topics from scientific researches, new discoveries,







conservation, to tips for cultivation. We will hire English-Japanese interpreters for consecutive interpretation of the presentations.

The conference dinner is planned at the banquet room “Ciel” on the 14th floor of the Hotel Monterey Himeji, located directly north of Himeji Station, on Friday May 26. There you can enjoy a good mix of Japanese and Western cuisines and

Japanese sake and wine, together with an impressive nighttime view of Himeji Castle through the windows.

In Meeting Room 6 on the 4th floor of Himeji Citizens Hall, various carnivorous plants from the botanical gardens and CP societies will be displayed for the public. Several CP sales booths will open in the same room. In recent years, sales events of carnivorous plants have been attracting more people.

After the 3-day conference, there will be a special day trip by bus to two botanical gardens near Himeji on May 29. This is an optional event requiring separate registration and fee.

In the dome-shaped conservatory of Tegarayama Conservatory Botanical Garden, there are many *Nepenthes* hybrids created in Japan as well as big *N. truncata*.

Hyogo Pref. Flower Center (HPFC) has Japan’s best CP collections including National Collection of *Nepenthes*. In August 2022, the 55.5 cm-tall pitcher of *N. truncata* was certified as the Guinness World Record of the tallest *Nepenthes* pitcher. You can see big size plants of *N. clipeata*, *N. pervillei*, and *N. khasiana* as well as variety of *Sarracenia*, *Drosera*, *Pinguicula*, *Cephalotus*, *Roridula*, etc. in the green houses, the open garden, and the back yard. You can’t miss this opportunity to see the carnivorous plants grown in amazing condition in these 2 botanical gardens.

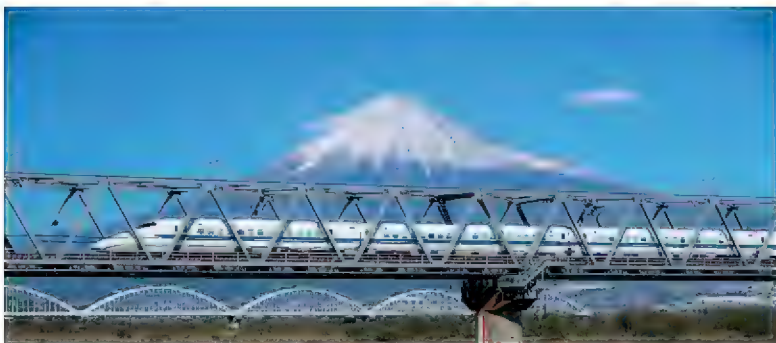
We will visit the habitats of *D. lunata*, *D. rotundifolia*, and *D. tokaiensis* in either Nishiwaki City or Kasai City, which is to be determined by our pre-visit in mid-May.







Those who visit *Pinguicula ramosa* habitat on May 31 will travel from Himeji to Tokyo riding a “Hikari” Shinkansen train and stay at a hotel in Kitasenju.



On the following day (May 31), we will take a Tobu express train to Nikko City and visit the habitat of *P. ramosa*, the Japanese endemic butterwort on Mt. Nyoho after 2 hours of climbing a gentle slope. Hopefully we can see flowers blooming, but this is not guaranteed as the flowering time fluctuates from year to year.

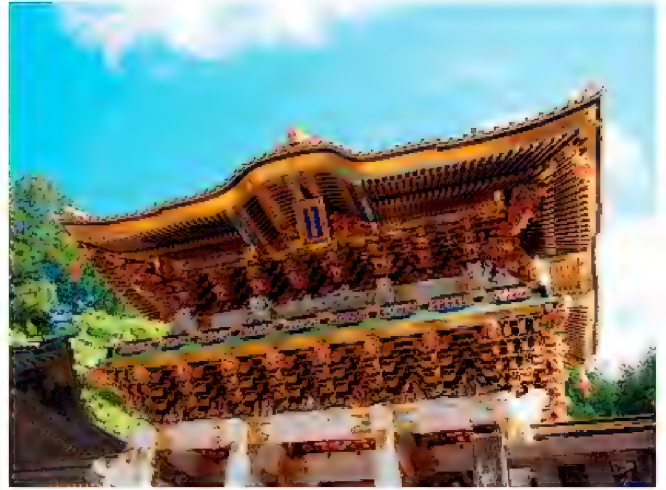


You may want to visit sightseeing spots before or after the conference. In Himeji area, there are more sightseeing spots other than Himeji Castle. For example, you may be interested in Shoshazan Engyoji Temple which was used as the film location of “Last Samurai.” Please visit the web page, <https://www.himeji-kanko.jp.e.adl.hp.transer.com/> for the details and other information.

After visiting *P. ramosa* habitat, some of you may want to visit another World Heritage site, Nikko Toshogu Shrine. You can find your accommodations and access to the shrine in the web page, <https://www.visitnikko.jp/en/>.

For more information for traveling Japan, please visit <https://www.japan.travel/en/>.





### INFORMATION FOR FOREIGN TRAVELERS

Japanese government significantly relaxed the border measures against COVID-19 in October 2022. Now foreign nationals can enter Japan under the same conditions as in 2019, but with either a valid vaccination certificate (3 doses) or a certificate of negative result of pre-departure COVID-19 test. Please check the following site for the latest information.

<https://www.japan.travel/en/practical-coronavirus-information/government-measures/>

For the registration to the conference, conference dinner, day trip to the 2 botanical garden and the field trips, please visit the conference web page of which URL link is available in ICPS web page <https://www.carnivorousplants.org/>.

For more information and registration for presentation, contact Koji Kondo (kokonchip@gmail.com), the Organizer Team representative for overseas participants.

Looking forward to see you in Himeji in this coming May!



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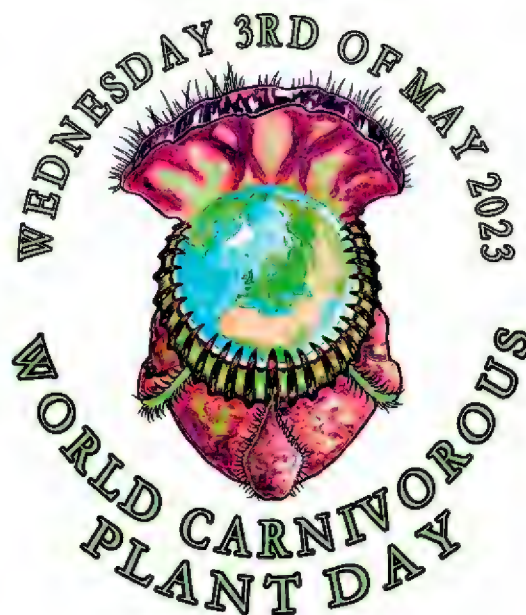
<https://doi.org/10.55360/cpn521.ec503>

World Carnivorous Plant Day (WCPD) is always the first Wednesday in May. Be sure to check out our YouTube channel as well as our Instagram and Facebook pages. We will be posting videos hourly to celebrate the best group of plants in the world. If you want to submit a video for this year, please email me at the above address. We are looking for content that is 15-20 minutes in length. Conservation and cultivation themes are what we are looking for.

WCPD ends in our annual photo contest which is open to anyone who is a ICPS member or who follows our social media pages. Twenty-one countries entered the contest last year with about 150 photos submitted. Let's beat it this year. The submission deadline is 14 April 2023. Winners receive a 1-year membership to the ICPS. Details can be found at <https://www.carnivorousplants.org/about/PhotoContests/PhotoContestRules>

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*NEPENTHES BERBULU* (NEPENTHACEAE), A PITCHER PLANT FROM  
PENINSULAR MALAYSIA WITH REMARKABLY LONG LID BRISTLES

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**Abstract:** A species of *Nepenthes* endemic to Peninsular Malaysia and distinctive for its extremely developed lid hairs is described and illustrated. *Nepenthes berbulu* is a highland species known only from a handful of peaks in the Titiwangsa Range. It is classified here within the recently defined *N. macfarlanei* group, for which a dichotomous key is provided. The description of this taxon brings the total number of *Nepenthes* species recognised from Peninsular Malaysia to eighteen.

## Introduction

Nepenthaceae Dumort. is a monotypic family comprising the genus *Nepenthes* L., a group of carnivorous plants commonly known as tropical pitcher plants, or *periuk kera* ('monkey pots') in Malay. This genus of at least 160 accepted species is primarily distributed across the Malesian and Papuan biogeographic regions, with centres of diversity in Sumatra, Borneo, and the Philippines (Danser 1928; Jebb & Cheek 1997; Clarke *et al.* 2018). In the last 20 years, the genus has received significant attention from botanists and enthusiasts alike, resulting in a series of significant discoveries that have led to the description of many taxa at species rank, as well as emended circumscriptions of existing species concepts (Akhriadi *et al.* 2004; Clarke *et al.* 2006; Mey *et al.* 2011; Cheek & Jebb 2013; Robinson *et al.* 2019; Bianchi *et al.* 2020; Golos *et al.* 2020).

Despite being situated between the exceptionally speciose islands of Sumatra and Borneo, Peninsular Malaysia has, until very recently, been considered comparatively poor with respect to *Nepenthes* with only 11 recognised species (Clarke 1999, 2001; McPherson 2009; Clarke & Lee 2012; McPherson & Robinson 2012).



Recently, novel explorations of poorly botanised peaks coupled with systematic reviews of living and pressed *Nepenthes* from more frequently visited peaks across the Malay peninsula have led to the definition of several hitherto undescribed species. Since 2020, five species have been named: *N. domei* M.N.Faizal, A.Amin & Latiff; *N. latiffiana* M.N.Faizal, A.Amin & Dome; *N. malayensis* A.Amin, M.N.Faizal & Dome; *N. sericea* Golos, Wistuba, G.Lim, Mey, S.McPherson & A.S.Rob.; and *N. ulukaliana* Wistuba, Mey, Golos, G.Lim, S.McPherson & A.S.Rob. (Ghazalli *et al.* 2020; Tamizi *et al.* 2020a; Lim *et al.* in prep. 2023). One nothospecies — *N. × setiuensis* A.Amin, M.N.Faizal & Dome — has also been described during this time (Tamizi *et al.* 2020b). Though considered a natural hybrid between *N. macfarlanei sensu lato* and *N. gracilis* by its describing authors, it is here found indistinguishable from *N. gracillima*, of which *N. setiuensis* is thus considered a later synonym.

Building on the works of Hemsley and Ridley in the region (Hemsley 1905; Ridley 1908, 1909, 1924), an outcome of these recent studies has been a revised delimitation of the *Nepenthes macfarlanei* concept — resolving some taxonomic uncertainty surrounding this species — and the circumscription of a group of taxa closely allied with it. These comprise *N. macfarlanei sensu stricto*, *N. alba*, *N. gracillima*, and the as yet undescribed *N. sericea* and *N. ulukaliana* (Lim *et al.* in prep. 2023). To this group is here added *Nepenthes berbulu* H.L.Tan, G.Lim, Mey, Golos, Wistuba, S.McPherson & A.S.Rob., thus far observed from five peaks in the Titiwangsa Range, all in the Pahang–Perak and Pahang–Selangor border regions. This brings the total number of species recognised from Peninsular Malaysia to eighteen (Table 1).

## Materials and methods

Field observations of *Nepenthes berbulu* were made in February 2020 and August 2022. Allied taxa were studied across peaks of the Bintang Range (Gunung Bubu), Timur Range (Gunung Tahan), and Titiwangsa Range (Cameron Highlands, Genting Highlands, Fraser’s Hill, and others). Voucher specimens were examined at K, KEP, L, and SING herbaria (acronyms follow Thiers 2022+).

Herbarium material was collected by Gideon Lim under permit ref. JH/100 Jld. 33(35) issued by the Forest Department of Peninsular Malaysia, and subsequently deposited at KEP and KLU. Fine measurements of live material were made using Vernier callipers and a tape measure. Measurements on herbarium material of small-scale structures such as hairs were made using a stereomicroscope. Close-ups of voucher specimens were taken using a Canon EOS 80D with Canon EF 100mm f/2.8L Macro IS USM.

Locality data for the distribution map was taken from herbarium records and information gathered from field observations and plotted using SimpleMappr (Shorthouse 2010).

## Species description

The following description of *Nepenthes berbulu* is based on the type material, and observations and measurements made *in situ* at the type locality, chiefly of the summit population; plants growing at slightly lower elevations in montane forest generally produce larger foliage and longer tendrils.

***Nepenthes berbulu*** H.L.Tan, G.Lim, Mey, Golos, Wistuba, S.McPherson & A.S.Rob., *spec. nov.* (Figs. 1–10)



Table 1. A summary of the known <i>Nepenthes</i> of Peninsular Malaysia.		
Species	Elevational range (m)	Distribution
<i>N. alba</i>	1400–2187	Peninsular Malaysia
<i>N. albomarginata</i>	0–1100	Borneo, Peninsular Malaysia, and Sumatra
<i>N. ampullaria</i>	0–2100	Borneo, Maluku Islands, New Guinea, Peninsular Malaysia, Riau Islands, Singapore, Sumatra, and Thailand
<i>N. benstonei</i>	150–1350	Peninsular Malaysia
<i>N. berbulu</i>	1400–2100	Peninsular Malaysia
<i>N. domei</i>	850–1000	Peninsular Malaysia
<i>N. gracilis</i>	0–1100	Borneo, Cambodia, Peninsular Malaysia, Riau Islands, Singapore, Sulawesi, Sumatra, and Thailand
<i>N. gracillima</i>	900–2000	Peninsular Malaysia
<i>N. kerrii</i> *	150–700	Peninsular Malaysia (Langkawi) and Thailand
<i>N. latiffiana</i>	1000–1100	Peninsular Malaysia
<i>N. macfarlanei</i>	1500–1657	Peninsular Malaysia
<i>N. malayensis</i>	800–1000	Peninsular Malaysia
<i>N. mirabilis</i>	0–1500	Malay Archipelago, Indochina, southern China, northern Australia, and western Micronesia
<i>N. rafflesiana</i>	0–1200	Borneo, Peninsular Malaysia, Riau Islands, Singapore, and Sumatra
<i>N. ramispina</i>	900–2000	Peninsular Malaysia
<i>N. sanguinea</i>	300–1800	Peninsular Malaysia and Thailand
<i>N. sericea</i>	900–2150	Peninsular Malaysia
<i>N. ulukaliana</i>	900–1800	Peninsular Malaysia

\*The presence of this species in Peninsular Malaysia is based on a population occurring on Langkawi Island, in the Malaysian state of Kedah. This island taxon, clearly a member of the Indochinese *Nepenthes thorelii* aggregate, is tentatively identified as *N. kerrii* following Clarke (2018).

**Type:** — MALAYSIA. **Perak:** Titiwangsa Range, above 1900 m (exact location withheld for conservation reasons), 23 August 2022, *Lim 4* (holotype KEP!, isotypes KEP! [7 sheets] & KLU! [2 sheets]) [holotype: stem with three upper pitchers, female inflorescence, and infructescence; iso-KEP: stem with two lower pitchers (sheet 1), stem with two upper pitchers (sheets 2 & 3), stem with two lower to intermediate pitchers (sheet 4), stem with intermediate pitcher (sheet 5), stem with two infructescences (sheet 6), stem with male inflorescence (sheet 7); iso- KLU: stem with upper pitcher and infructescence (sheet 1), stem with two lower pitchers (sheet 2)].

**Diagnosis:** — *Nepenthes berbulu* differs from *N. macfarlanei* in having laminae of short and climbing stems that are oblong-elliptic with rounded-obtuse apices (vs. lanceolate with acute apices); lower pitchers that are broadly infundibular in lower half and cylindrical above a pronounced hip (vs. ovate in lower half and cylindrical above a faint hip); upper pitchers that are infundibular at the base and broadly cylindrical above a basally situated hip, with a flattened ventral surface between



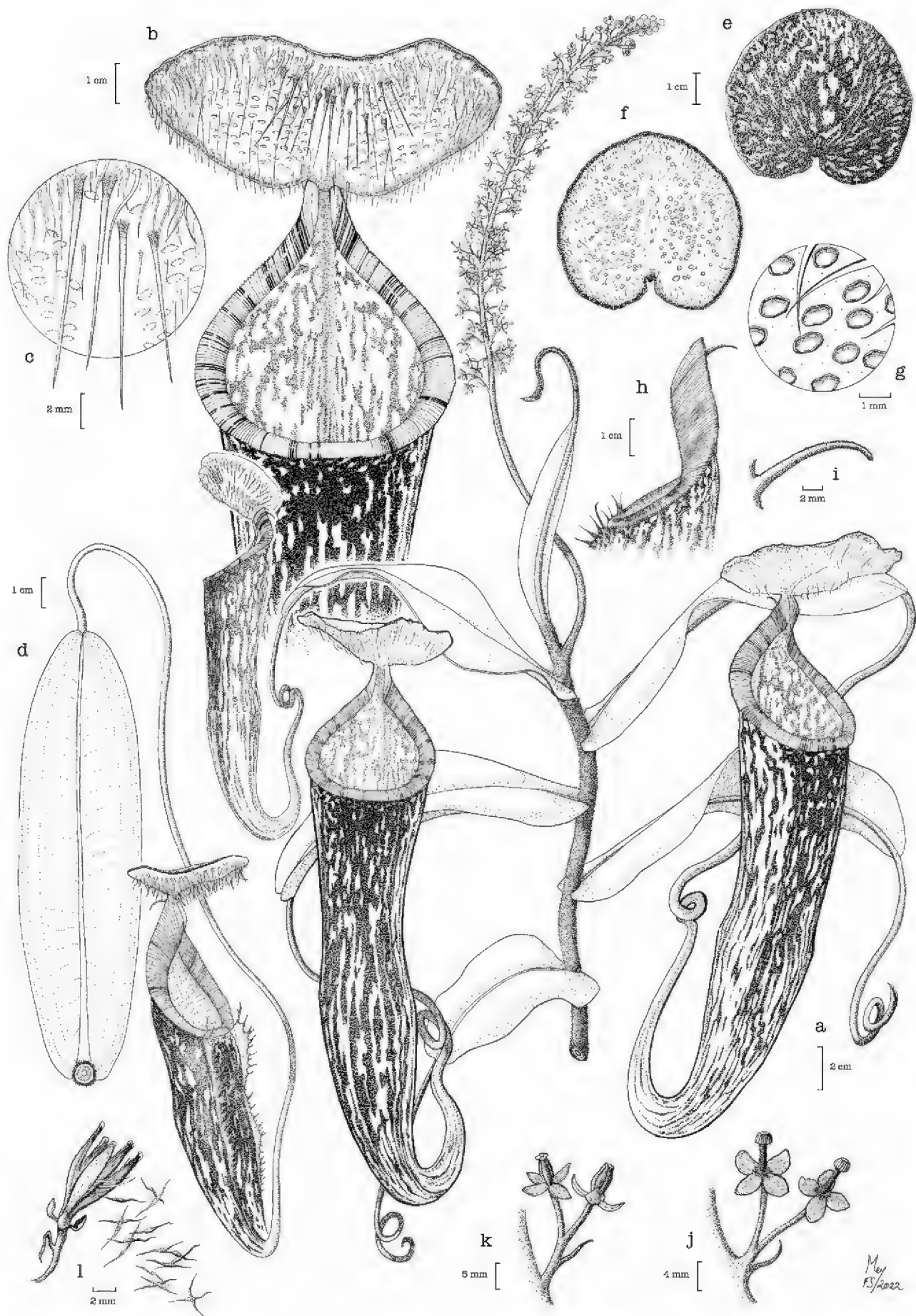


Figure 1: *Nepenthes berbulu* H.L.Tan, G.Lim, Mey, Golos, Wistuba, S.McPherson & A.S.Rob. (a) Habit with upper pitchers and male inflorescence. (b) Close-up of upper pitcher showing lid underside and mouth. (c) Detail of thickened bristles near lid apex. (d) Rosette leaf with lower pitcher. (e) Upper surface of lower pitcher lid. (f) Lower surface of lower pitcher lid. (g) Detail of lower pitcher lid glands. (h) Peristome of lower pitcher in lateral aspect, showing pronounced column. (i) Spur. (j) Male flowers. (k) Female flowers. (l) Seedpod with dispersing seeds. Based on the type material (*Lim 4*) and photographs and measurements made *in situ* at the type locality. Illustration by F.S. Mey.





Figure 2: *Nepenthes berbulu*. Robust female flowering plant with upper pitchers growing among summit scrub at the type locality; note the dried infructescence to the left. Photograph by F.S. Mey.

the wing vestiges (vs. wholly infundibular with a hip just below peristome or absent, and often slightly constricted below the mouth causing ventral gibbosity); and bristles on lower surface of lid aggregated towards lid apex (vs. evenly distributed).

**Description:** — Terrestrial, erect, subscandent or climbing shrub. *Stems* branched, to ca. 3–5 m long, generally terete, occasionally slightly angular in basal part of mature vine, 5–10 mm in diameter, basal part ligneous, woody, becoming brittle with age, herbaceous and ductile above. Internodal length 1.5–5.5 cm in rosettes, 1.7–9 cm in climbing stems. *Leaves* sessile, ± spirally



arranged, sometimes intermittently distichous. Laminae coriaceous, thick, brittle when mature, sub-oblongate to oblong in seedlings and young rosettes, oblong-elliptic to slightly obovate in short and climbing stems, 9.5–19 cm long, 3.5–6.5 cm wide, margins entire, apex rounded-obtuse, sometimes emarginate and/or slightly asymmetrical at tendril attachment, base cuneate, clasping stem for  $\geq 3/4$  of its circumference, not decurrent, sometimes very slightly auriculate with indistinct lobes in rosette stage. Longitudinal veins 3 on either side of midrib in outer  $1/2$  of lamina, barely discernible in living specimens, conspicuous in herbarium material, pinnate veins distinct near midrib. Tendrils of rosette pitchers uncoiled, 10–26 cm long, tendril length to pitcher height ratio 3:1 to 4:1; of lower to intermediate pitchers uncoiled, 23–41 cm long, 3–5 mm wide, generally of ratio 1.7:1 to 2.5:1; of upper pitchers coiling once or twice, 9–22(–50) cm long, 2–5 mm wide, often shorter than pitcher height, generally of ratio 1:1 to 1:1.7. *Rosette pitchers* infundibular to narrowly obovate in lower half, slightly constricted at midpoint to form a hip,  $\pm$  cylindrical above, widening slightly



Figure 3: *Nepenthes berbulu*. Lower pitchers borne on long tendrils among summit scrub at the type locality. Photograph by F.S. Mey.



towards mouth, to *ca.* 7 cm tall, *ca.* 2 cm wide, tendril ventrally attached, wings  $\leq 3$  mm wide with fringe elements  $\leq 3$  mm long and  $\leq 2.5$  mm apart, mouth ovate, oblique, raised towards rear to form a recurved neck  $\leq 3$  cm tall, peristome sub-cylindric in section, 1.6–2 mm wide at front, broadening and flattening towards rear of pitcher, reaching 3.2–4 mm at column, ribs fine but pronounced, teeth triangular-acuminate, minute. Lid sub-elliptical to orbicular or reniform, apex rounded to obtuse, occasionally retuse, base sometimes cordate, lower surface densely covered with bristles  $\leq 4$  mm long, inclined towards lid base and interspersed with large nectar glands. Spur simple, filiform, apex acute. *Lower to intermediate pitchers* often with free-hanging tendrils, broadly infundibular in lower half, delimited by  $\pm$  pronounced hip, cylindrical above, 12–25 cm tall, 4–6 cm wide at peristome, 4–5.5 cm wide at hip, tendril ventrally or laterally attached. Wings 2–5 mm wide with fringe elements  $\leq 8$  mm long, widely spaced. Mouth ovate to rounded-triangular, oblique. Peristome 10–17 mm wide at column, 4–7 mm wide at front, with fine but pronounced ribs, teeth minute but clearly



Figure 4: *Nepenthes berbulu*. Lower to intermediate pitchers at the type locality. Photograph by A. Wistuba.



discernible in rear portion. Lid orbicular to reniform, usually slightly broader than long, 5–6.5 cm long by 5–7 cm wide, orientated horizontally to *ca.* +30° from horizontal, apex rounded to obtuse, rarely broadly retuse, base cordate, lower lid surface with rigid aciculate bristles, fleshy at base where 0.5 mm wide, 7–10 mm long,  $\pm$  orientated towards centre of lid, often with particularly dense aggregations near lid apex and largely absent from central portion, interspersed with large glands, lid glands elliptical, crateriform, conspicuously rimmed, *ca.* 0.5–1.5 mm in diameter, concentrated in two groups on either side of midline or  $\pm$  evenly distributed throughout. Inner pitcher surface glandular in basal half, remainder waxy. Spur inserted near base of lid, simple, filiform, 8–14 mm long, apex acute, often slightly curved downwards. *Upper pitchers* broadly infundibular in basal 2/5 to 1/2, narrowing slightly just above the pronounced hip,  $\pm$  cylindrical above with flattened ventral surface between wing vestiges, often widening markedly just below peristome, chartaceous in upper portion, becoming woodier below hip, 15–27 cm tall, 4–8 cm wide at peristome, 3.5–5 cm wide at hip, tendril dorsally attached. Wings reduced to prominent ridges, sometimes with fringed remnants immediately below peristome. Mouth ovate to rounded-triangular, oblique, ascending laterally at an angle of 50–60° towards pitcher rear, gradually becoming vertical at column, column  $\leq$  5.5 cm tall and recurved towards pitcher opening at angle of 10–20°. Peristome sub-cylindric in section, 3–8 mm wide at front, broadening and flattening towards rear of pitcher, reaching 9–18 mm at column, ribs *ca.* 0.5 mm apart, conspicuous teeth present only in rear portion of peristome, serrulate, fine, triangular-acuminate. Lid orbicular to reniform, often slightly wider than long, 5–7.5 cm long by 5–7 cm wide, otherwise as in lower to intermediate pitchers. Lower lid surface with numerous rigid bristles  $\leq$  10 mm long, form and distribution as in lower to intermediate pitchers. Basal half to two-thirds of inner pitcher surface densely glandular, upper third waxy. Spur as in lower to intermediate pitchers, 3–10 mm long. *Male inflorescence* mostly two-flowered throughout, *ca.* 100 flowers in total, peduncle *ca.* 16 cm long, rachis *ca.* 19 cm long, bracts prominent, simple, filiform, inconsistently produced. Tepals ovate to broadly elliptic, *ca.* 4 mm long, 2 mm wide, apex obtuse to rounded, adaxially concave with numerous nectar glands. *Female inflorescence* basally two-flowered, one-flowered above, *ca.* 35 flowers in total, peduncle 16–20 cm long, rachis 8.5–10 cm long, bracts as in male flowers, tepals elliptic, *ca.* 5 mm long, 2 mm wide, apex acute. Seeds fusiform, *ca.* 5 mm long, centrally rugose, with well-developed wings. *Odour* vanilla-like. *Indumentum* of orange-brown to rufous hairs, variable in development and extent; that of stem  $\leq$  1 mm long in leaf axils, apical portion with dense layer of fine brown hairs, otherwise much shorter, patchy to glabrescent; inconspicuous on abaxial leaf surface except on midribs where similar to that of leaf axils, adaxial surface mostly glabrous, but sparsely covered in short, fine brown hairs, mainly concentrated on and around midrib; emergent tendrils covered in short, soft, velvety brown caducous hairs; mature pitchers appearing glabrous; inflorescences with brown pubescence throughout, particularly on partial peduncles, pedicels, tepal bases and abaxial surfaces, fruit bases, and androphore.

*Colour* of mature stems dark orange, dark brown or nearly black. Leaves bright green. Lower pitchers yellow, yellowish green, olive green or dark pink, mottled with dark red, dark brown to purple speckles. Peristome yellowish green with reddish stripes so numerous that it appears entirely red, dark red, or dark purple. Lower pitcher lid as per the pitcher body on the upper surface, yellowish green slightly suffused with red in the margins on the lower surface. Upper pitchers pale green at the base becoming progressively creamy to bright white above, with red, dark red, or maroon speckling, or occasionally coloured entirely red or black with white, yellow, or green speckles. Peristome predominantly bright to pure white with some red stripes. Lid mostly white on both surfaces, sometimes suffused with red in the margins. Bristles white, pale green, orange, dark orange to dark brown or almost black.



Additional specimens examined

*Nepenthes berbulu* — MALAYSIA. **Pahang:** Titiwangsa Range, summit, *ca.* 2040 m [“6700 ft”] (exact location withheld for conservation reasons), no date, *Wray* 339 (SING!) [stem with upper pitchers; identified as possibly *N. gracillima* × *N. macfarlanei* by B.H. Danser, August 1927]; Titiwangsa Range, *ca.* 1400 m [“*ca.* 4600 ft”] (exact location withheld for conservation reasons), June 1933, *Banfield* s.n. (SING! [2 sheets]) [stems with lower pitchers (both sheets)]; Titiwangsa Range, near summit, *ca.* 1460 m [“4800 ft”] (exact location withheld for conservation reasons), 30 December 1939, *Holttum* S.36511 (SING! [2 sheets]) [rosette with pitchers and stem with lower pitcher



Figure 5: *Nepenthes berbulu*. Intermediate pitcher at the type locality. Photograph by F.S. Mey.





Figure 6: *Nepenthes berbulu*. Intermediate pitcher at the type locality; note the exceptionally dense, whitish, thickened bristles of the lid. Photograph by A. Wistuba.

(sheet 1); separate lower pitcher and lamina (sheet 2)]; Titiwangsa Range, *ca.* 1460 m [“4800 ft”] (exact location withheld for conservation reasons), 30 December 1939, *Holttum* 36512 (SING!) [stem with upper pitcher]; Titiwangsa Range, summit, *ca.* 1370 m [“*ca.* 4500 ft”] (exact location





Figure 7: *Nepenthes berbulu*. Upper pitchers from the type locality at ca. 1900 m (A–C) and from a different peak at ca. 1400 m (D). Photographs by A. Wistuba (A) & F.S. Mey (B–D).

withheld for conservation reasons), 23 September 1940, *Addison S. 37379* (SING!) [stem with upper pitchers and infructescence]; Titiwangsa Range, heath forest at summit plateau, ca. 2020 m [“6600 ft”] (exact location withheld for conservation reasons), 22 September 1994, *Chua et al. FRI 39045* (KEP!) [stem with upper pitchers and infructescence]; Titiwangsa Range, heath forest at summit plateau, ca. 1430 m [“4700 ft”] (exact location withheld for conservation reasons), 23 September





Figure 8: *Nepenthes berbulu*. A robust plant with particularly colourful upper pitchers growing among summit scrub at the type locality. Photograph by F.S. Mey.

1994, *Chua et al.* FRI 39048 (KEP! [4 sheets], L!, SING!) [stems with upper pitchers and female floral material (all sheets)].

*Nepenthes macfarlanei* — MALAYSIA. **Perak:** G. Bubu, *ca.* 1460–1620 m [“4800–5300 ft”], March 1885, *Dr. King’s Collector* 7395 (SING!) [stem with upper pitcher and male inflorescence]; G. Bubu, *ca.* 1460–1620 m [“4800–5300 ft”], March 1885, *Dr. King’s Collector* 7421 (**lectotype** K! [designated by Jebb & Cheek 1997:57], isolecto- K! [3 sheets]) [separate lower, intermediate, and upper pitchers (lecto-); stem with upper pitcher and male inflorescences (isolecto- sheet 1); stem with upper pitchers (isolecto- sheet 2); separate lower and intermediate pitchers (isolecto- sheet 3)]; G. Bubu, summit, no elevation data, 8 April 1933, *Symington FMS* 30848 (KEP!) [stem with upper pitchers]; G. Bubu, summit, 1656 m [“5434 ft”], 31 January 1938, *Ladow FMS* 45159 (KEP!) [stems with upper pitchers and female inflorescences]; summit of G. Bubu via Manong, *ca.* 1650 m [“5400 ft”], 10 June 1978, *Shah & Mahmud MS* 3986 (KEP!, SING!) [stem with upper pitcher (KEP); stem with upper pitchers and infructescence (SING)]; G. Bubu Besar, summit trail to G. Bubu Kecil, 1600 m, 20 April 1995, *Chua*





Figure 9: *Nepenthes berbulu*. Lid underside showing thickened bristles; note that they are concentrated towards the apex and margins of the lid. Photograph by A. Wistuba.

*FRI 39091* (KEP!, L!) [stem with upper pitcher and infructescence (KEP); stem with upper pitchers and male inflorescence (L)]; G. Bubu summit, exposed montane forest, 1657 m, 20 December 2006, *Lim FRI 52833* (KEP!) [stem with upper pitcher]; G. Bubu summit, mossy shaded montane forest, 1653 m, 20 December 2006, *Lim FRI 52835* (KEP!) [stem with lower pitchers]; G. Bubu, 1615 m, 17 August 2022, *Lim 2* (KEP! [3 sheets]) [stem with upper pitchers and infructescence (sheet 1); stem with lower pitchers (sheet 2); stem with upper pitchers and male inflorescence (sheet 3)].

Only type material is enumerated for the following species. For an exhaustive list of examined specimens refer to Lim *et al.* (in prep. 2023).

*Nepenthes alba* — MALAYSIA. **Pahang:** G. Tahan, *ca.* 1520 m [“5000 ft”], 3 June 1905, *Wray & Robinson 5411* (**lectotype** SING! [designated by Jebb & Cheek 1997:44], isolecto- BO n.v.) [stem with upper pitchers and male inflorescence (SING)].

*Nepenthes gracillima* — MALAYSIA. **Pahang:** G. Tahan, *ca.* 1010 m [“3300 ft”], 29 May 1905, *Wray & Robinson 5309* (**lectotype** SING! [designated by Jebb & Cheek 1997:43], isolecto- BO n.v.) [stem with upper pitchers].

*Nepenthes sericea* — MALAYSIA. **Kelantan:** G. Warpu, 1745 m, 19 August 2022, *Lim 3* (**holotype** KEP!, isotypes KEP! [3 sheets]) [stem with upper pitchers and male inflorescences (holo-); stem with lower pitcher (iso- sheet 1); stem with upper pitchers and infructescences (iso- sheet 2); stem with upper pitchers (iso- sheet 3)].



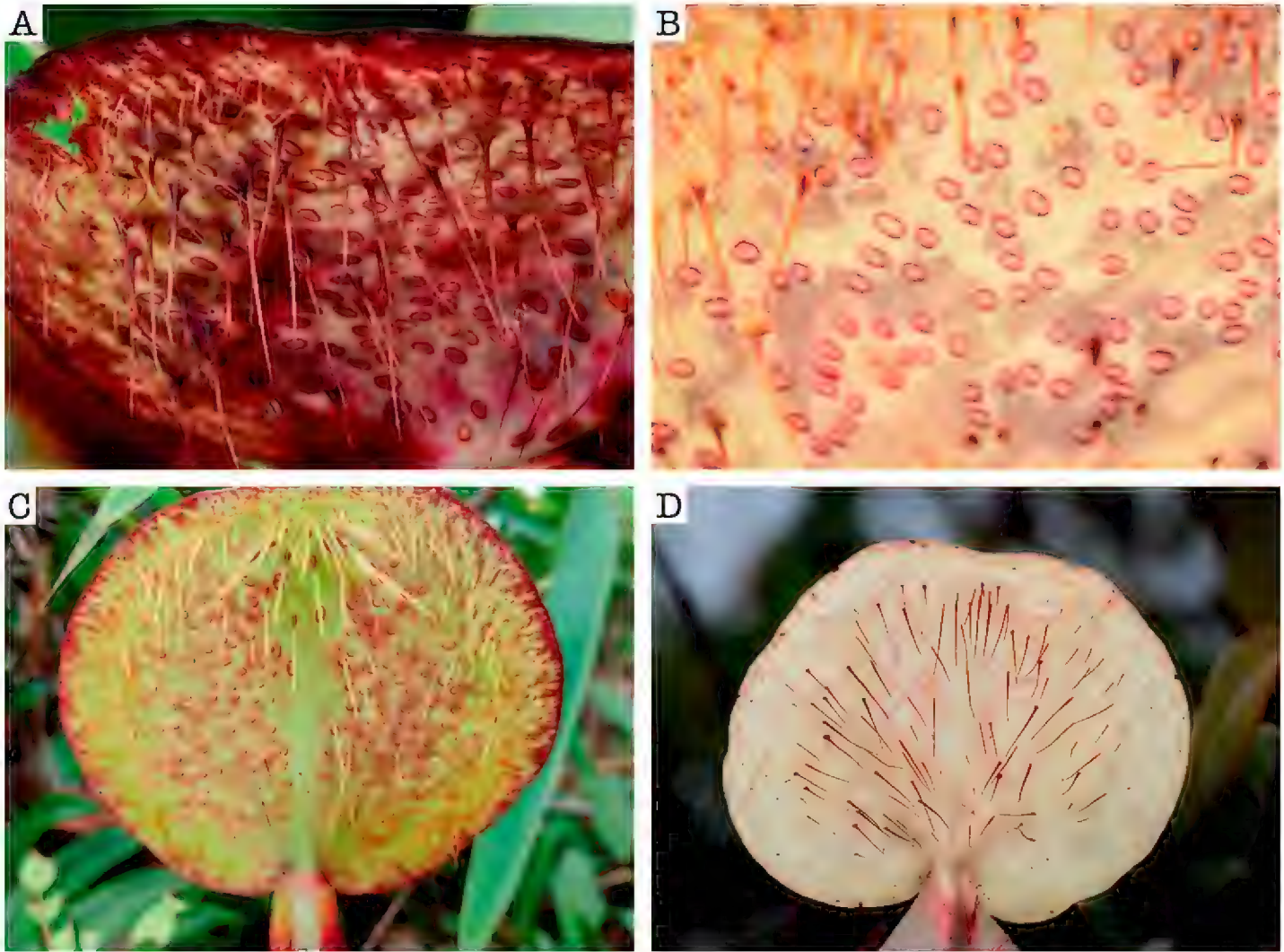


Figure 10: *Nepenthes berbulu*. Details of lower lid surface: (A) close-up of the thickened bristles of an aged lower pitcher; note droplets of condensed water; (B) conspicuously rimmed, crateriform nectar glands of a preserved pitcher; (C) a typical arrangement of bristles with two 'bald patches', one either side of the midline; note dense apical aggregation; (D) an upper pitcher lid unusually lacking both the lateral 'bald patches' and bristles near the lid margins. Photographs by M.R. Golos (A), H.L. Tan (B), G. Lim (C) & A. Wistuba (D).

*Nepenthes ulukaliana* — MALAYSIA. **Pahang:** G. Ulu Kali, 3°26.21'N 101°47.11'E, 1707 m, 16 February 2007, *Julius FRI 54894* (**holotype** KEP!) [stem with upper pitchers and male inflorescences].

**Etymology:** — The epithet *berbulu* is derived from the Malay prefix *ber-* (having) and the noun *bulu* (hair, bristle), in reference to the basally fleshy bristles found on the lower surface of the pitcher lid.

**Botanical history:** — In 2019, photographs taken by hikers in the southern Titiwangsa Range (Peninsular Malaysia) were noticed online by author GL showing a highland *Nepenthes* with long, needle-like bristles beneath its lid. An expedition by HLT, GL, Bryan Chong Yik Khuan, Khairisyahmie Bin Khairisham, and two guides was successfully made in February 2020 to survey the plants *in situ*. Inspection of the plant's coarse morphological characteristics suggested that the plants represent an undescribed species.

However, author ASR noted that the lid hairs of this undetermined taxon closely resemble those present in the type material of *Nepenthes macfarlanei* at Kew herbarium (*King's Collector 7421*; lecto- K, isolecto- K) collected on Gunung Bubu, though the pitchers were otherwise divergent in



shape. The original description of *N. macfarlanei* by Hemsley (1905) refers specifically to the “stiff bristles” present beneath the lid; however, Macfarlane (1914) describes the taxon as “bearing few to many long rigid unicellular hairs”, a different prospect to thickened, multicellular bristles. The possibility was thus raised that the newly documented plants might be congruent with type *N. macfarlanei* from its *locus classicus* on Gunung Bubu, leading to concerns about the appropriateness of the prevailing concept of *N. macfarlanei sensu lato* as a widely distributed and highly variable species that produces hairs beneath its lid that are simply highly variable in terms of length, firmness, and micromorphology (Danser 1928; McPherson 2009; Cheek & Jebb 2012; Clarke & Lee 2012; McPherson & Robinson 2012). Herbarium specimens of *N. macfarlanei* from Gunung Bubu held at Kepong Herbarium (KEP) were examined by HLT, who noted that, though they possessed the stiff, thickened bristles described, they exhibited a different distribution of bristles beneath the lid to the taxon described here as *N. berbulu*, in addition to different upper pitcher shape.

Subsequent expeditions were organised in order to visit the *locus classicus* of *Nepenthes macfarlanei*, Gunung Bubu, to generate an up to date and accurate circumscription of the species, as well as to visit several parts of the Titiwangsa Range to photograph, collect, and study both the potentially undescribed taxon and other populations of *N. macfarlanei sensu lato* so as to support a comprehensive comparison with the type. These expeditions were halted when the SARS-CoV-2 (Covid-19) pandemic made non-essential travel impossible for 2 years.

In August 2022, the study resumed when FSM, SRM, AW, and MRG set up an expedition to Peninsular Malaysia to join the Malaysian authors HLT and GL. The team was able to locate *Nepenthes macfarlanei* on Gunung Bubu that perfectly matched the Kew type specimens.

The field study led to an emended description of the hitherto poorly understood *Nepenthes macfarlanei*, and descriptions of two taxa previously lumped within “*N. macfarlanei*” *s.lat.*, namely *N. sericea* and *N. ulukaliana* from the Cameron Highlands and Genting Highlands, respectively (Lim *et al.* in prep. 2023). It also became clear that the plants found in the southern Titiwangsa Range that prompted this comprehensive study do indeed differ consistently from *N. macfarlanei s.str.*

During the course of the second expedition series, mountain guides showed the authors a photograph of a half-dried pitcher with long bristles resembling those of *Nepenthes berbulu* and *N. macfarlanei* taken on a low (*ca.* 1400 m asl) peak 15 km to the south of the type locality. This specimen matched herbarium records of a species with long bristles collected from the same location. That peak was climbed by GL, FSM, MRG, and AW, who were able to locate three plants and confirm that they also represent *N. berbulu*. These three individuals represent the currently known southernmost occurrence of this species, as well as the lowest elevation from which it has been recorded. Most other known records of *N. berbulu* are from above 1900 m asl.

**Phenology:** — Male inflorescences of *Nepenthes berbulu* were observed during the first expedition in late February 2020. Some developing female inflorescences and seedpods were found as well but in smaller numbers. Infructescences and both male and female inflorescences were observed in August 2022 (Fig. 2).

**Distribution and ecology:** — *Nepenthes berbulu* has been recorded from five peaks in the south-central Titiwangsa Range, between 1400 and 2100 metres above sea level (Fig. 11). At the type locality, *N. berbulu* is common within a relatively narrow elevational band from *ca.* 1900 m to the summit, where it is the only *Nepenthes* present. The upper reaches of the mountain are frequently covered in dense cloud even at midday during the dry season, supporting the development of an extensive mossy forest (Fig. 12). On one other peak, at *ca.* 1400 m, *N. berbulu* grows sympatrically



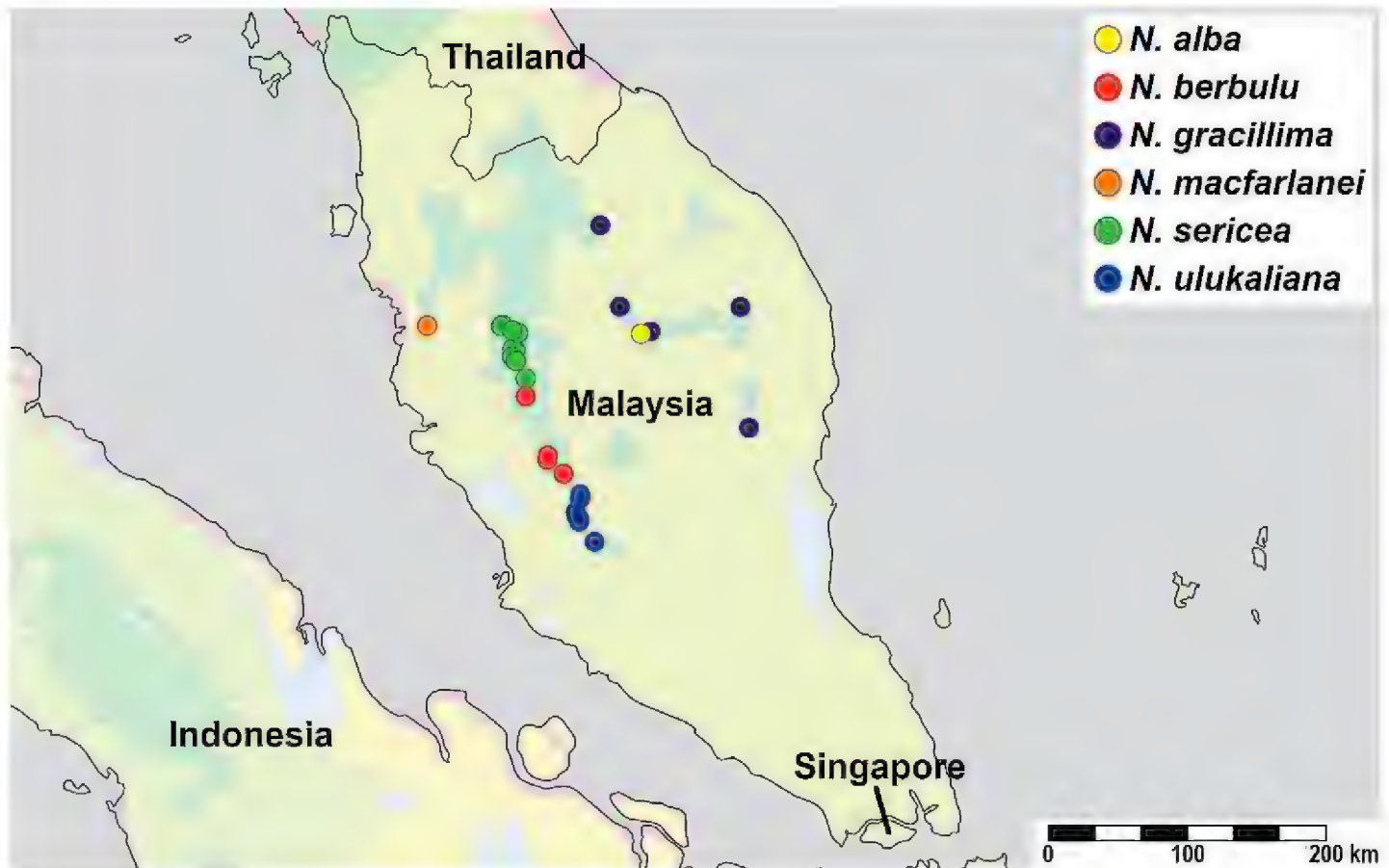


Figure 11: Known distribution of *Nepenthes berbulu* and closely related species of the *N. macfarlanei* group, based on field observations and voucher specimens. Several of the *N. gracillima* localities are based on tentative identifications and require field work to confirm. The coloured areas show ecoregions defined by the World Wide Fund for Nature (WWF); note that all known species of this group are confined to the 'Peninsular Malaysian montane rain forests' ecoregion, which roughly corresponds to areas above 1000 m in elevation. Drawn by M.R. Golos & G. Lim.



Figure 12: Mossy upper montane forest just below the summit at the type locality of *Nepenthes berbulu*. Photograph by M.R. Golos.





Figure 13: *Nepenthes berbulu* plant with lower pitchers growing in mossy forest just below the summit. Note the larger foliage and longer internodal length as compared to summit plants. Photograph by M.R. Golos.

with an undescribed taxon, and a handful of putative natural hybrids between the two have been recorded. Here, the summit habitat was observed to be considerably drier than at the type locality.

*Nepenthes berbulu* is known only from a *ca.* 60 km stretch of the Titiwangsa Range. Herbarium specimens, supported by photographs shared by hikers on social media, show that it occurs on at least two peaks up to 50 km north of the type locality; however, further north of that the species is replaced by *N. sericea*. South of the type locality, *N. berbulu* ranges for a further 15 km before it is likewise replaced in its habitat niche by *N. ulukaliana*. At present, there are no known locations where the three species co-occur, and no natural hybrids have been recorded.

At the type locality, *Nepenthes berbulu* grows terrestrially in stunted ericaceous forest at the summit, and in mossy forest below the summit. In the mossy forest, *N. berbulu* grows terrestri-





Figure 14: *Nepenthes berbulu* climbing stem with upper pitchers (centre) and rosette with lower pitcher (top left) growing epiphytically in mossy forest at the type locality. Photograph by M.R. Golos.



Figure 15: Flowering plants of *Nepenthes berbulu* emerging above the surrounding summit vegetation at the type locality. Photograph by G. Lim.





Figure 16: Putative natural hybrid between *Nepenthes berbulu* and *N. sanguinea*; note the lack of bristles under the lid. Photograph by M.R. Golos.

ally or an as an epiphyte on moss-covered trees (Fig. 13), or on *Sphagnum* moss-covered earth banks. Plants growing in the mossy forest tend to be comparatively longer and vine up the trees. Pitchers may be seen hanging down from the trees as the plant scrambles up the canopy (Fig. 14). Conversely, plants at the summit are usually shorter and grow upright, intertwined among bamboos and stunted shrubs. On the summit, the upper pitchers of *N. berbulu* can be easily spotted thanks to their brightness as they protrude out of surrounding vegetation in a manner similar to the Bornean species *N. muluensis* (Fig. 15); the lower pitchers are often hidden within the shrubs. A single putative hybrid with *N. sanguinea*, recorded at a lower elevation of *ca.* 1700 m, was observed (Fig. 16).

**Infauna and prey:** — During the August 2022 field trip, some *Nepenthes berbulu* upper pitchers were found to contain groups of very small dipterans just above the water line, perhaps in the pro-





Figure 17: Arthropods found in association with the pitchers of *Nepenthes berbulu*, as visitors, infauna, and prey, at the type locality at ca. 1900 m (A–E) and on a second peak at ca. 1400 m (F): (A) live dipterans resting just above the fluid level in an upper pitcher; (B) live infaunal larva from an upper pitcher – note the dark colour of the fluid; (C) beetle and ant prey from a lower pitcher; (D) spider prey from a lower pitcher; (E) long-legged centipede and dipteran prey from an upper pitcher; (F) ants massing at the lid nectaries of a lower pitcher. Photographs by F.S. Mey (A) & M.R. Golos (B–F).

cess of emerging, and resting on the inner walls (Fig. 17A). One pitcher contained a living larva that resided in very dark, orange-brown pitcher fluid (Fig. 17B).

Larger prey items included a beetle (Fig. 17C), a spider (Fig. 17D), a long-legged centipede of the order Scutigeromorpha (Fig. 17E), and several dead Tenebrionidae larvae, the latter all found in a single pitcher. These were often accompanied by a number of small dipteran and hymenopteran prey, including ants. Ants have been observed gathering under some pitcher lids, presumably feeding on the nectar therein (Fig. 17F).



The pitcher fluid of *Nepenthes berbulu* is notably viscous, both in open and late-stage unopened pitchers. Litmus paper was used to measure the acidity of fluid in unopened pitchers at pH 4 and that of opened pitchers at pH  $\pm 3$ .

**Conservation status:** — *Nepenthes berbulu* has been observed by botanists on a few peaks and according to citizen science (in the form of photographs taken by tourist hikers) it is likely to occur on several others. The species is afforded a certain level of protection since the peaks where it is confirmed to occur are part of a protected area, and the species' range encompasses other suitable mountains with steep terrain unlikely to be subject to development or logging. However, all these peaks are quite accessible for experienced hikers and the species is therefore subject to unscrupulous collection. During the preparation of this paper, images of *N. berbulu* briefly appeared on certain social media groups advertising wild plants for sale; these plants were apparently soon sold. The potential value of this species in the horticultural trade means that it is at significant risk of over-collection.

Observations of *Nepenthes berbulu* made *in situ*, together with information gleaned from voucher specimens, satisfy the IUCN 3.1 Red List EN (Endangered) criteria B1ab(ii,iii,v)+2ab(ii,iii,v) (IUCN 2012), i.e. the species has an extent of occurrence (EOO) of <5000 km<sup>2</sup>, an area of occupancy (AOO) of <500 km<sup>2</sup>, and is known from no more than five locations, with projected declines in area of occupancy, quality of habitat, and number of mature individuals. Though all known populations of *N. berbulu* occur in areas that are unlikely to be impacted by land development in the foreseeable future, habitat degradation and population decline are anticipated as a result of poaching for the horticultural trade, which has already significantly impacted a number of *Nepenthes* and is estimated to threaten almost a third of known species (Cross *et al.* 2020).

## Discussion

The *Nepenthes macfarlanei* group is being circumscribed in Lim *et al.* (in prep. 2023). The most remarkable character shared by all these taxa is the presence of hairs under the lid that are developed to varying degrees. This group of species includes *N. macfarlanei*; the as yet undescribed *N. sericea* and *N. ulukaliana* (two taxa long included within a broad concept of *N. macfarlanei*); *N. alba*; *N. gracillima*; and now *N. berbulu*. A key to the currently recognised members of the group is provided below. The *N. macfarlanei* group appears closely related to the other highland species from Peninsular Malaysia, namely *N. sanguinea* and its close relatives *N. latiffiana* and *N. malayensis*, as well as to *N. ramispina*. The clade of Peninsular Malaysian species itself seems to be closely related to the Indochinese ones, i.e., the species of the *N. thorelii* aggregate (Murphy *et al.* 2020). The divergence between the two groups might originate from the geographical division between the strongly seasonal Indochina, with its group of pyrophytic species (Mey *et al.* 2010), and the perhumid conditions of Peninsular Malaysia.

The *Nepenthes macfarlanei* group comprises species that are all endemic to Peninsular Malaysia. The monophyly of this informal unit is yet to be established and its relationship with the other species endemic to the Malay peninsula (*N. ramispina*, *N. sanguinea*, and the aggregate of *N. benstonei*, *N. domei*, and *N. thai*, three taxa which might turn out to be conspecific) investigated.

Within the *Nepenthes macfarlanei* group, *N. berbulu* appears closest to *N. macfarlanei*, as documented in the differential diagnosis, though it also shows close affinities to *N. alba*, *N. gracillima*, *N. sericea*, and *N. ulukaliana* (Fig. 18).



**Key to the species of the *Nepenthes macfarlanei* group**

1a. Pitchers with thickened lid hairs $\geq 5$ mm long .....	2
1b. Pitchers with filamentous lid hairs $\leq 2$ mm long .....	3
2a Upper pitchers wholly infundibular, typically white, base green .....	<i>N. macfarlanei</i>
2b Upper pitchers broadly cylindrical, white with dark speckling, base green .....	<i>N. berbulu</i>
3a Lower pitchers wholly ovate, amphora-shaped .....	<i>N. ulukaliana</i>
3b Lower pitchers infundibular to ovate in the lower part, cylindrical or slightly infundibular above the hip.....	4
4a. Small upper pitchers, <13 cm tall, usually conspicuously white and often with red speckling, hip at or above the midsection .....	<i>N. alba</i>
4b. Large upper pitchers, often >20 cm tall .....	5
5a. Upper pitchers slender, cylindrical, predominantly mottled with black or red speckling, hip at or typically below the midsection .....	<i>N. gracillima</i>
5b. Upper pitchers broadly infundibular or broadly cylindrical, white, base green, hip at midsection to immediately below the peristome .....	<i>N. sericea</i>

*Nepenthes berbulu* is easily distinguished from *N. alba* and *N. gracillima* by the large bristles present beneath the lid. However, the upper pitchers of all three species are superficially similar in being basally infundibular but cylindrical above the hip. These similarities aside, *N. berbulu* is easily distinguished from *N. alba* by its larger stems, foliage, and pitchers, the latter also differing in terms of their proportions; the diminutive upper pitchers of *N. alba* are strongly hipped, and the hip is normally present above or at the mid-point of the pitcher, whereas in *N. berbulu* the hip is not strongly pronounced and is typically present one third of the way up the pitcher from its base. While *N. gracillima* is larger and more robust than *N. alba*, being of comparable overall size to *N. berbulu*, it is a more slender plant with linear-lanceolate leaves (versus oblong-elliptic in *N. berbulu*) and narrower upper pitchers. Though dispreferred, the secondary determinants of colour and geography can be used to further distinguish these species (see Table 2).

*Nepenthes berbulu* also shares some characteristics in common with *N. sericea* and *N. ulukaliana*, the two remaining species of the *N. macfarlanei* group. While the former species does occasionally produce upper pitchers that are cylindrical above the hip (Fig. 18N), *N. berbulu* is easily distinguished from both based on its bristly lid hairs alone.

The function of the hairs under the lid in all species of the *Nepenthes macfarlanei* group is open to conjecture but is generally assumed to be related to prey specialisation. Their presence, especially when they are as developed as in *N. berbulu* and *N. macfarlanei*, might be an adaptation to retain insects visiting in search of nectar for longer and with more precarious footholds above the pitcher fluid, potentially increasing the likelihood of prey capture. The interaction of the long bristles of these species with heavy cloud, leading to dew formation, is a possible avenue for investigation, as one of the authors (GL) observed bristles covered with morning dew drops (Fig. 10A) that easily fall into the pitcher below at the slightest disturbance, potentially taking prey with them.

GL also noticed a species of ant (possibly of the genus *Crematogaster*) foraging on the undersides of the lid, apparently unphased by the long bristles. The ants were observed to walk safely between the bristles in search of the exudate produced by the prominent nectar glands (Fig. 10B), positioning



themselves to feed at the bases of the bristles without ever climbing on the bristles themselves. A similar observation was made by Hemsley, who noted that the bristles of *N. macfarlanei* s.str. seemed to keep away flying insects whilst allowing ants to crawl among the bristles to drink the nectar (Hemsley 1905). Also noteworthy is the fact that the bristle arrangement in *N. berbulu* is distinct from that of *N. macfarlanei*. In *N. berbulu*, the bristles are typically situated at the apex and along the margins of the lid, often leaving a bristle-free region of variable extent centred on the midline of the lid (Fig. 10C). These ‘bald’ patches vary in prominence across individuals of the population and are absent in a minority of plants which exhibit no such bald patches (Fig. 10D). The bald patches are not to be confused with a lack of bristles resulting from breakage by age or mechanical force, which seems to be quite common in older pitchers, since bristle attachment remains absent from the bald areas (Fig. 10B).

The authors hope that future studies can be conducted to better understand the complex relationships between *Nepenthes berbulu* and its associated organisms, such as the cf. *Crematogaster* ants, and to gain insight into how the different lid hair structures and arrangements produced by the respective species in the *N. macfarlanei* group optimise prey capture or enhance mutualistic relationships with organisms.

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Figure 18: Comparison grid of the six species of the *Nepenthes macfarlanei* group, showing lower pitchers, upper pitchers, and hairs under the lid: (A–C) *N. berbulu*, (D–F) *N. macfarlanei*, (G–I) *N. alba*, (J–L) *N. gracillima*, (M–O) *N. sericea*, (P–R) *N. ulukaliana*. Photographs by F.S. Mey (A–C, E–F, M–N, left, O–Q), M.R. Golos (D, R), S.R. McPherson (G, I, K), Chien C. Lee (H, J, L) & the late Christophe Maerten (N, right).





Figure 18: Continued.

combined expertise, rich mountaineering knowledge and professional services contributed greatly to the success and fulfillment of our expedition. Finally, we wish to acknowledge Malaysia Carnivorous Plants (MyCP) for initiating this venture of expeditions to develop a better understanding of the *Nepenthes* of Peninsular Malaysia.



Table 2. A comparison of the species of the <i>Nepenthes macfarlanei</i> group. Morphological characters of all taxa are based on observations made in the Bintang Range (Gunung Bubu), Timur Range (G. Tahan), and Titiwangsa Range (G. Ulu Kali, Cameron Highlands, Fraser's Hill, and others), supplemented by information from Clarke & Lee (2012).						
	<i>N. berbulu</i>	<i>N. macfarlanei</i>	<i>N. alba</i>	<i>N. gracillima</i>	<i>N. sericea</i>	<i>N. ulukaliana</i>
<b>Geographical range</b>	Titiwangsa Range (south-central)	Bintang Range (G. Bubu)	Timur Range (G. Tahan)	Timur Range, Tapis Range, possibly northeastern Titiwangsa Range	Titiwangsa Range (north-central, mainly Cameron Highlands)	Titiwangsa Range (southern, mainly Genting Highlands)
<b>Elevational range (m)</b>	1400–2100	1500–1657	1400–2187	900–2000	900–2150	900–1800
<b>Habitat</b>	Terrestrial in ericaceous summit forest and epiphytic or terrestrial in mossy forest	Terrestrial or epiphytic in mossy forest	Terrestrial in ericaceous summit forest or in mossy forest	Terrestrial or epiphytic in montane forest	Terrestrial or epiphytic in mossy forest	Terrestrial or epiphytic in mossy forest
<b>Leaves</b>	Oblong-elliptic, apex rounded-obtuse	Lanceolate, apex acute	Linear to lanceolate, apex acute	Linear to lanceolate, apex acute	Lanceolate or spatulate, apex acute	Oblong to broadly lanceolate, apex rounded
<b>Lid hairs</b>	Thick, coarse bristles, to 10 mm long, unevenly distributed, densely aggregated near lid apex	Thick, coarse bristles 5–12 mm long, evenly distributed	Very fine, to 1 mm long	Fine, to 2 mm long	Fine, to 2 mm long	Fine, to 1 mm long
<b>Lower pitchers</b>	Broadly infundibular in lower half, with a pronounced hip, cylindrical above	Ovate in the lower half with a faint hip, cylindrical above	Infundibular to ovate in lower third, narrowing above a distinct hip and cylindrical to slightly infundibular toward pitcher opening	Ovate in lower half, narrowing slightly above and cylindrical toward pitcher opening	Ovate in lower half with a distinct hip, cylindrical above	Amphora-shaped to urceolate
<b>Size of lower pitchers</b>	To 25 cm tall and 6 cm wide	To 22 cm tall and 7 cm wide	To 12 cm tall and 4.5 cm wide, usually much smaller	To 22 cm tall and 7 cm wide	To 26 cm tall and 9 cm wide	To 25 cm tall and 8.5 cm wide



Table 2. Continued.						
	<i>N. berbulu</i>	<i>N. macfarlanei</i>	<i>N. alba</i>	<i>N. gracillima</i>	<i>N. sericea</i>	<i>N. ulukaliana</i>
<b>Colour of lower pitchers</b>	Yellowish green, olive green or dark pink, mottled with dark red, dark brown or purple. Peristome yellowish green with reddish stripes, sometimes entirely red, dark red, or dark purple	Yellowish green, speckled dark red or purple. Inner wall of pitcher light yellowish-green. Peristome red or dark purple	Purplish brown, with a paler interior and dark purple or black peristome. Colouration very consistent	Yellowish green, speckled dark red or purple, interior pale yellowish green. Peristome green or reddish, often striped with bands of dark red or purple	Yellow, green, purple or red, mottled with dark red or purple	Yellowish green, sometimes with a reddish hue, mottled with brown, dark red or purple
<b>Lid of lower pitchers</b>	Orbicular to reniform	Sub-orbicular	Orbicular or elliptic	Elliptic or ovate	Sub-orbicular to ovate	Orbicular to sub-orbicular
<b>Upper pitchers</b>	Broadly infundibular below, slightly narrowing just above the hip, cylindrical above, ventral surface flattened between wing vestiges, often widening markedly just below peristome	Wholly infundibular, hip located just below peristome or absent, often narrowing below mouth to appear ventrally gibbous	Infundibular in the lower 1/2–2/3, sharply contracted at the hip, cylindrical to narrowly infundibular above	Narrowly infundibular in the lower 1/3, gradually contracted above the hip, cylindrical above	Wholly infundibular with hip located just below peristome or with hip located at mid-point and cylindrical to slightly infundibular above	Wholly infundibular with hip absent or located just below peristome
<b>Size of upper pitcher</b>	To 27 cm tall and 8 cm wide	To 24 cm tall and 7 cm wide	To 13 cm tall and 4 cm wide	To 26 cm tall and 5 cm wide	To 24 cm tall and 7 cm wide	To 18 cm tall and 7 cm wide
<b>Colour of upper pitchers</b>	Pale green basally, creamy white in the tubulose part to bright white near the mouth, with red, dark red or maroon speckling	White throughout with red speckling, to green with dark purple speckles and peristome banding	Predominantly white often with red speckling	Bright green, but often so strongly speckled with black as to appear almost uniformly black with green speckling	Green to yellowish green basally, white above	Green basally, yellow to creamy white above, sometimes with sparse reddish speckling
<b>Lid of upper pitchers</b>	Orbicular to reniform	Sub-orbicular	Orbicular or elliptic	Elliptic or ovate	Sub-orbicular	Sub-orbicular



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## TWO NEW NATURAL *SARRACENIA* HYBRIDS FROM THE GULF COAST

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### Introduction

It has been two years since I accepted ICPS president Richard Nunn's invitation to serve on the board of this wonderful society, and I have loved every minute of it. In those two years, I have put myself toward developing more protections for *Sarracenia* habitat on the American Gulf Coast, and have learned much about the long history of rare flora conservation and land stewardship in the various southeast states.

While visiting Mississippi, a new hybrid was found that I have chosen to name after devoted conservationist Dr. Ken Gordon, the late Heritage Botanist of Mississippi. Doing so has precedent in the established tradition of naming *Sarracenia* nothospecies after people who study or protect them. As Dr. Gordon was a Mississippian, and as he was instrumental in protecting land that this hybrid may be found on, I think it is fitting that he be honored by the naming.

In a different context, for the past year I have been working with the late Dr. Larry Mellichamp on some botany of the gulf coast *Sarracenia*, a discourse he had long been involved in. In evaluating the various hybrids of the region, a particularly rare one was found to have been overlooked. I found it miraculously preserved in cultivation. Long though it has been known, it was never technically treated, its rarity in its narrow native range is the likely reason behind the oversight. I am very pleased to name it after Larry.

Sarraceniology engenders many facets, but perhaps the most challenging in the field is the study of the hybrids. To distinguish between hybrid and species can be among the most cognitively activating of all tests of knowledge about the genus. I have found it demands a sure sense of not merely the diagnostic traits of the species but a familiarity with the forces and structures behind their combinations, a lesson of discrimination between the structures and behaviors common throughout the genus. It demands a knowledge of the plasticity of their states.

The hybrids I discuss here have been seen and recorded in the wild before, but never formally named. Naming them at long last certifies their existence in nature, where they are indeed exceedingly rare.

### *Sarracenia* × *gordonii* (Fig. 1)

In June 2022, in Jackson County, Mississippi, Ren Oliver and I found *S. alata* (Wood) Wood and *S. psittacina* Michx. growing without other congeners in a roadside right-of-way near Gautier. A small number of their hybrid progeny were found, which we photographed, and a voucher was collected and pressed. In other areas where the two species live together, we also found their hybrids. The hybrid only occurs in places that have been recently disturbed (mowing, burning, off-road vehicle traffic, etc.).



Long ago, this cross was discussed but left unnamed by Bell & Case (1956). Plants were discovered in Mobile County, Alabama (*Bell 1534; Case P-62a*) that could have been *Sarracenia alata* × *S. psittacina*, but as the plants were collected from an area where *S. rosea* Naczi, F.W.Case & R.B.Case was also present, these authors were not entirely sure that *S. rosea* could be ruled out of the pedigree. They refrained from diagnosing the plants and never followed up on the issue, leaving the identity of the specimens unascertained.

*Sarracenia* ×*gordonii* Trexler & Oliver *nothosp. nov.* TYPE: Jackson County, Mississippi, west of Gautier, roadside ditch. 31 May 2022. *Trexler 0009* (HOLOTYPE: UNCC).

*Sarracenia* ×*gordonii*, *hybrida naturalis inter S. alata et S. psittacina, foliis puberulentibus et recumbentibus, extus colore sanguinea et viride suffusis, venulis fere atropurpureis, tubis extus et interne obscure areolatis, phyllodiis raris et minoribus, 2.1 cm longis, foliis carnivoribus 11.3 cm - 12.5 cm longis.*

Plants are intermediate between *Sarracenia alata* (Wood) Wood and *S. psittacina* Michx., often forming ground-hugging rosettes, as in *S. psittacina*, but plants bearing suberect to erect leaves are also to be expected in the field. Rhizomes may be vertically or horizontally oriented (horizontal in the type specimen). Lids and orifices are often fused shut and incapable of trapping insects, forming a globose head with a pointed tip, the orifice facing toward the center of the rosette. Some plants in the field indeed had open orifices through which prey could have entered and thereby be consumed. Pitcher leaves recumbent, glabrate, suffused with red venation, faintly areolate along the tube, ala reduced as in *S. alata* (in contrast to the flamboyantly broad wing of *S. psittacina*). Pitchers textured rigidly and waxy in life, suggesting that they are as durable as the *S. psittacina* parent in winter and may be partially to entirely evergreen. Faint pubescence from the *S. alata* parent should be anticipated on some plants in the field too.

*Sarracenia* ×*gordonii* should be sought where *S. alata* and *S. psittacina* occur together in Mississippi and Alabama. In places where *S. alabamensis* subsp. *wherryi* (D.E.Schnell) Case & Case, *S. leucophylla* Raf., and *S. rosea* Naczi, Case & Case also grow with *S. alata* and *S. psittacina*, this cross may be impossible to diagnose, even when in bloom. The areolation from *S. leucophylla* may become utterly suffused with pigment in its primary hybrids and so discriminating between crosses by foliar traits among the other areolate-leaved taxa may be extremely unreliable in the field where *S. leucophylla* is found alongside *S. alata* and *S. psittacina*. Therefore, they may be impossible to tell apart from *S. ×wrigleyana* Hort. Veitch ex Mast. in places where *S. leucophylla* is also present with the parent taxa. Hybrids may be nearly impossible to tell apart from *S. ×casei* Mellichamp in Washington County, Alabama, after petal drop.



Figure 1: *Sarracenia* ×*gordonii* at the type location. Photo by C. Trexler.



Presence of undulation in the lid margins and white pigment in the distalmost portions of the leaves may help distinguish the hybrids from each other. The peculiar mode of acropetal dehiscence in *S. leucophylla* may be another indicator of its influence in these crosses.

The hybrid is uncommon in cultivation but not unheard of. Dr. Jan Schlauer notes at least two cultivars of it exist in ICPS records: *S.* ‘Robin Louise’ J. & P. Pietropaolo 1986 and *S.* ‘Yellow Eel’ S. Amoroso 2014. The charming and memorable (if weird) *S.* ‘Alien Banana’, a favorite of mine, is also of this cross. This cultivar was featured by Romanowski (2002: 93), but I have not been able to locate it in U.S. American cultivation.

A common name for this hybrid, if there must be one, can be Gordon’s Mute Trumpet, in respect to the usually closed (and sometimes upright) pitchers, which have long been called “trumpets” in colloquial English (e.g., “white trumpet” for *S. leucophylla*, or “yellow trumpet” for *S. alata* and *S. flava*). However, it is good practice to seek common names from amongst the residents of the plant’s native range before inventing a nonscientific moniker. This is so any established lexicological history of the nothospecies is not overlooked outside botany.

Heather Sullivan, Heritage Botanist at the Mississippi Museum of Natural Sciences at Jackson, proposed her late predecessor, Dr. Ken Gordon, to be this hybrid’s namesake. Dr. Gordon was responsible for protecting *Sarracenia* habitat in Mississippi, including environments unusual for the genus to inhabit. Notably this includes the westernmost sliver of range of *S. alabamensis* subsp. *wherryi*. Without his excellent foresight and hard work much would have been lost to conservation, history, and science.

I thank Heather Sullivan and Ren Oliver for helping me find and study this rare hybrid in Mississippi, and Dr. Jan Schlauer for editing and reviewing the manuscript.

### *Sarracenia* × *mellichampii* (Fig. 2)

*Sarracenia flava* L. once grew in Baldwin County, Alabama, alongside *S. leucophylla* Raf., *S. psittacina* Michx., *S. rosea* Naczi, Case & Case, and *S. alabamensis* subsp. *wherryi* (D.E. Schnell) Case & Case. *Sarracenia alata* (Wood) Wood also grew there in an extremely limited range (Mellichamp 2009). Baldwin County was at one time one of the most, if not *the* most, diversely populated region for wild-growing *Sarracenia* in the world, once famous for its six endemic parent taxa, which resulted in enormous and fantastic hybrid swarms (now largely extirpated). Perhaps the rarest and most unexpected of these hybrids was *S. alabamensis* subsp. *wherryi* × *S. flava*.

This cross has long been regarded as rare. In a remarkable instance of east meets west, the parent taxa coexisted as recently as 30 years ago in a few sites in Baldwin and possibly Escambia counties, Alabama (Folkerts 1992). They were also found growing close to each other in adjacent Escambia County, Florida to the east, which is the easternmost part of the range of *S. alabamensis* subsp. *wherryi* (Mellichamp 2007, unpublished data). In the past, the range of *S. flava* extended instead from the north through Escambia County, Alabama (where it is extant), into Baldwin County, Alabama. In Baldwin, it appeared patchy south of the vicinity of Splinter Hill in the middling-southeasterly reaches of the county near the border with Florida, notably around the vicinity of Seminole. These populations are now long gone. *Sarracenia alabamensis* subsp. *wherryi* is rapidly dwindling in the county.

This hybrid is perhaps one of the rarest we know of. Of the 12 locations where both parents occurred in proximity, only two of those sites were ever known to have spawned the hybrid, and when present it was always uncommon (Folkerts 1992).

Incredibly, a single plant of *S. alabamensis* subsp. *wherryi* × *S. flava* has endured in a few private collections for the past three decades. From Bob Hanrahan’s original wild collection in the 1980s in Baldwin County, it has been distributed many times. I have the same clone from two sources: former





Figure 2: *Sarracenia*  $\times$  *mellichampii* and flower. Photo by M. Wang (left), C. Trexler (right).

ICPS president Jay Lechtman and Mike Wang. I do not know the ownership histories behind Mr. Wang’s plant. Mr. Lechtman got his from Michael Fantus of Washington, DC, in the late 1990s. Mr. Fantus acquired it from Mr. Hanrahan, who in turn collected it from the wild. Mr. Hanrahan asserted that the plant was of wild origin from Baldwin County, Alabama (Jay Lechtman, pers. comm.).

I recognize *S. alabamensis* Case & Case as a separate species from *S. rubra* Walter. The formula of *S. x popei* Mast., a synonym *pro parte* (if *S. alabamensis* is not considered separate from *S. rubra* at species rank) for the cross, is *S. flava*  $\times$  *S. rubra*. The lectotype of *S. x popei* as designated by Nelson (1986) and prepared by Masters in 1881 bears no information regarding the provenance of its parents. The plant was bred artificially at Glasnevin by David Moore and a pitcher and flower of it pressed by Masters in 1881. It was described in *The Gardeners’ Chronicle* (1881) that year as well.

The dark lip of the pressed specimen from Glasnevin is not a trait derived from *S. flava* and is strictly never a trait of *S. alabamensis* subsp. *wherryi*, but it is a common feature of the *S. rubra* populations of the Atlantic coast. The venation extends to the distal portion of the long, narrow lid, further implying influence of *S. rubra* from the Atlantic coast. The earliest record we have of *S. alabamensis* subsp. *wherryi* is a collection made by Pollard in Mississippi in August 1896 (as *S. flava* L.), so it seems unlikely then that the taxon now known as *S. alabamensis* subsp. *wherryi* was involved in the cross that produced the lectotype of *S. x popei* in 1881.

I believe therefore that the name *S. x popei* was not applied to a hybrid of what we now know to be *S. alabamensis* subsp. *wherryi*  $\times$  *S. flava* and was indeed bred from a *S. rubra* subsp. *rubra* of Atlantic stock. This means a new name for the hybrid *S. alabamensis* subsp. *wherryi*  $\times$  *S. flava* can be designated.

***Sarracenia*  $\times$  *mellichampii* Trexler nothosp. nov.** TYPE: Baldwin County, Alabama. 14 October 2022. *Trexler 0042* (HOLOTYPE: cultivated foliage and a flower of this hybrid from a plant originating in the wild has been seen, pressed, and deposited at the herbarium at UNCC).



Syn.: *Sarracenia* ×*popei* Masters, Gard. Chron., n.s., 16: 40 (1881) p.p.

*Sarracenia* ×*mellichampii*, hybrida naturalis inter *Sarracenia alabamensis* subsp. *wherryi* et *S. flava*, foliis tubiformibus angustis, necnon dilatatis lato, peristomio margine revoluto non stricto, adaxiale inciso et colore flavo-viride, tubis extus textura dense pubescente, colore extus rubiginoso suffusus et flavis, fauce plerumque venulas atrosanguineas habens, foliis 17-50 cm altis, foliis vernalibus minoribus quam aestivalibus, phyllodiis erectis multis, 15-24 cm altis. Sepala ovata, colore limone-flavo, petalis panduriformibus, colore rubiginoso suffusus et flavis. Duos odores simul habens, similes fructis maturis et putris caseus est.

My plant is intermediate between the two parents, but largely has proportions similar to smaller *S. flava*. The brightly cream-colored mouth opens broadly, much like *S. flava* but with a slightly more pronounced gape, and has a weakly revolute, cream-colored peristome with a deeply incised spout. The throat bears red veins and a red throat patch. The texture is pubescent, which could be a trait of either parent, but is certainly a trait of *S. alabamensis* subsp. *wherryi*. Exterior color is suffused reddish-bronze with yellow in the lower portions of the leaves. The phyllodes are tall, and, critically, have terete petioles without the characteristic buttressing abaxial channel of *S. leucophylla*. This, combined with a noted lack of acute lid undulations, differing respective phenological affinities, and lack of areolae, safely eliminates *S. leucophylla* from the pedigree. The flowers are delightful – small, with yellow sepals and pendulous red panduriform petals. They are aromatic, scented like a pairing of fresh raspberries and extremely mature cheese. Their color and scent are a dead-giveaway to the plant's hybrid origin.

The common name for this hybrid, if there must be one, can be Mellichamp's Trumpet.

I would like to acknowledge the kind help of Jay Lechtman, Mike Wang, and Calen Hall in providing me with plants, history, and numerous photographs of this rare hybrid. I would also like to thank Ren Oliver and Dr. Jan Schlauer for editing the manuscript (and teaching me quite a bit in the process!).

I name *S. ×mellichampii* in honor of our own Dr. T. Larry Mellichamp, who passed away on September 12, 2022. Two weeks before he died, I told him that I would designate this rare hybrid in his name. Here I fulfill that promise.

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## THE TIMES THEY ARE A-CHANGIN’

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I haven’t been in this field for as long as some others so I wouldn’t classify myself as a “Dinosaur” (though “Megafauna” comes to mind) but still I have been growing carnivorous plants since 1985. During those years I have seen our hobby/business/research field change and not always for the good. More to the point, basically good ideas and developments resulted to some extent in negative developments. I think this is something that should be called out and put up for discussion, so allow me to take you on a walk down memory lane.

In the 1970s carnivorous plants were readily available in shops all over The Netherlands. Large specimens of *Darlingtonia californica* could be found in even run of the mill flower shops. Given the relatively low price, the size of the plants and lots of “imperfections” (signs that a bug has been eating some part of the plant, etc.) it was obvious that most if not all were taken from the wild and imported. Pitchers of *Sarracenia* were also common as “cut flower” in arrangements and many of those also probably came from the wild.

There simply were hardly any nurseries around and none of those that existed would have been able to spend the time on growing a plant that big and/or in those numbers for the going rates. This was not that strange in those days. People had a different view on conservation and rules worth mentioning were hardly in place in most countries, let alone on an international scale.

However, this was going to change.

First of all, let us do a reality check. Every plant or animal in a botanical garden, zoological facility, or even your windowsill can trace its ancestry back to a collection from the wild. In itself there was initially nothing thought to be wrong with that. Had those collections not taken place we would also have missed out on many lifesaving medications and for that matter a whole lot of other things we use every day.

Wild collection has also been happening for a very long time. The first farmers started selecting wild grasses to become our wheat and barley some 13000 years ago! However, the late 1960s and early 1970s were a time for different things and a taste for the exotic. From Indian restaurants bringing us exotic foods, to exotic houseplants. This came with the realization that a lot of money could be made catering to exotic (plant) tastes. Especially in the orchid and exotic pet trade business was booming. As the demand grew, we reached a point that we started to realize that something had changed. We took more from the environment than we needed and we didn’t bother to cultivate and reproduce what we took as we just went for more. Also, in the collection process as much, if not more, was destroyed than was actually taken.

As a counter reaction to this, 1975 saw the birth of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, better known as CITES.

Here we have the first perfect example from well-meant intentions also having an adverse effect. CITES was created to regulate the trade in wild, and especially rare, species. The idea was that by regulating the trade it would be easier to protect wild populations and prevent illegally collected material from reaching the marketplace.

That was not an undivided success. Yes, the trade was regulated and that had some effect, but the regulations were complicated and bureaucratic. Furthermore, CITES was mostly written with an eye for the protection of animals. But CITES also applied the same rules to plant protection,



which made much less sense the way the rules were written. What CITES thus also accomplished was to create serious obstacles for those who tried to follow the rules. By demanding huge amounts of paperwork and proof of provenance, the price of legal material got pushed up, making a “slight bending of the rules” very lucrative for those with a less well-developed sense of honesty. To put it bluntly, a side effect of the birth of CITES was to partly fuel the illegal trade because following the rules became such a pain in the behinds that turning to “the dark side”, or at least several (50?) shades of grey, was suddenly much more appealing.

So, where does that leave us young Skywalker?

Well, in the 1980s our beloved carnivorous plants, that in the 1970s were just part of the broad range of exotic plants, started to become fashionable, as shown by the fact that many of the older carnivorous plant societies were founded in the mid 1980s.

This produced two notable effects.

First of all, with the spread of information the demand for rare species and all things new grew fast. People saw these new plants on shows winning prizes and in newsletters people were showing their collections.

Human nature—being to want what it can afford (and sometimes more) and wanting things no one else has—meant that we saw a spike in the demand for these plants. You guessed it, score for the illegal trade.

On the other hand, people meeting in societies and at shows also saw amateurs selling and trading their surplus plants. That had, to some extent, a stabilizing effect on the trade. But for really rare stuff, CITES made trading between amateur growers, at least legally, in different countries very expensive in time and money (thank Darwin that the EU is one CITES-zone).

The increased interest in carnivorous plants gave also rise to a great hunger for information. The average grower generally lacked access to scientific publications and books were limited and often in a foreign language. Affordable books catering to novice growers were hard to find, until the publication of *The Savage Garden* (D’Amato 1998).

As the number of CP clubs grew useful information became available from experienced growers and newsletters.

The big bang for information however came with the rise of personal computers. Specifically, as early as the 30<sup>th</sup> of November 1990, the Carnivorous Plant listserv was launched (Brittnacher 2002) and shared information by using bulk e-mail to the subscribers. At that same time, the World Wide Web was developed by Tim Berners-Lee in 1989 at CERN, originally conceived and developed to meet the demand for automated information-sharing between scientists in universities and institutes around the world. In 1993, software was put in the public domain allowing the spread of modern websites, including the carnivorous plant world. The ICPS-website ([www.carnivorousplants.org](http://www.carnivorousplants.org)) went online about April 1999 (J. Brittnacher, pers. comm.).

In 1993, the Convention on Biological Diversity (CBD) was created to be the international legal instrument for “the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources”. This convention was created with well-meant intention and specifically to legally arrange ownership of biodiversity. The famous article 15 states: “Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation” and that “Access, where granted, shall be on mutually agreed terms” and “subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.” Basically, this was meant to, e.g., prevent medical companies from stripping a forest of its plants to see if they can find a cure for some



disease that will make them millions without paying the country of origin of the plant, let alone the traditional owners of that forest.

Again, although the intention is noble, it had two side effects that are not as desirable.

The first effect is creating a scientific and potential health problem when countries deny scientists and companies access to the plants without doing anything with them themselves. You can say that is well within their rights, but somehow it doesn't feel good knowing a possible cure for say AIDS is growing on some tree in a place that doesn't allow scientist to collect and analyze it.

The second is more troublesome from a conservation perspective. CITES regulated trade and created several hurdles for dealers, but the CBD resulted in much stricter rules in needing to prove that the original material was legally collected. I doubt if any nursery or hobbyist can really prove the legality of all of their plants to the point of origin.

Is that a problem? Well technically it is, but in general you are ok when the plant has been known to be in cultivation for years. The main issues are with new species and new locations.

And that brings us at the next step in our story.

In the late 1990s, it started to become much easier to visit exotic locations. Flights were more affordable and the concept of travelling without a group and no longer on a fixed tourist track became more common. Several parties actually started to cater to that, from local guides to companies that, especially since the 2010s, offer specific nature-based trips to the interested parties. Most of those guides and companies are perfectly legitimate and are actual nature lovers who managed to earn a living with their passion. Good for them! However, there are bad apples and even the honest ones open the way for poachers. It only takes one talkative porter to leak the news that something special was found.

With trips and even target species published online to get customers and with many people posting their finds delightedly on Facebook, Twitter, and personal blogs it is not difficult to find rare plants. The date and location of the trip is known and it only takes a halfway decent tracker to follow the tracks of such trips the next day as most of these trips with porters and all are small expeditions. They leave a track like a herd of elephants so to speak.

Not only do those trips, organized or private, inadvertently get the attention of poachers but every now and then they even find and describe new species. All of this contributes to the demand for plants, some of them so recently found that the first poached specimens are already on their way to greenhouses in Europe, the Americas, and elsewhere before the species is even properly named. This helps to create a demand that, due to paperwork and procedures couldn't be satisfied by commercial nurseries in a legal way. This is what the unscrupulous buyer wants. The number of obviously poached specimens on offer is staggering as are the prices that get paid. The 1995 birth of eBay created the perfect tool for these transactions, though other media have their share of the trafficked traffic.

The final development takes us to the present day.

Today we see a lot of people making reasonable wages – perhaps in some cases, too much money.

With consumers willing to pay too much money for plants, it also became very lucrative to start a business.

Previously, the number of nurseries were limited and everybody knew the people running them. The store-owners belonged within the carnivorous plant community because, besides earning a living, they actually had a genuine love for the plants.

This is sadly not always the case with the more recent nurseries. Yes, many are thoroughly decent, often former hobbyists that made their hobby their world – many are even good friends of



mine. But there are people who are just in it for the money. And here we have the pro and con of the latest decade. While there are more nurseries that are able to meet cultivation demands, the ethos of harsh business is popping up its head. Not that long ago business competition was being held in a decent way, with people actually helping each other out as there was a slice of bread for everyone to be had. But now I have noticed competitors actually going a long way to put the competition in a bad light, conversations are rude and are posted on the internet or social media for everyone to see. There is simply too much money to be had for some people to stay sociable, it seems.

I, and I hope you, will find this a sad and unwanted development and my hope for the next decade would be that we can shun these undesirable sellers into extinction and start afresh.

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UNEXPECTED CARNIVOROUS PLANT DISCOVERIES ON  
AN ADVENTURE TO CAPE YORK

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Abstract: In April 2022, I embarked on an epic 11-week road trip up the Cape York Peninsula to document the carnivorous plants of Australia’s remote tropics. During this expedition, it was the risks and unexpected discoveries that made my adventure most rewarding.

Cape York is by no means easy to get to. Large stretches of the main road up the Peninsula get washed away by the wet season floods every year, only to be rebuilt with the onset of the dry season. It is due to this remoteness that the carnivorous plants of the tropical Far North are rarely observed and poorly understood. So, as I left Sydney on an epic once-in-a-lifetime road trip to the most northerly point in Australia, a nervous excitement set in as I faced the thrill of facing the unknown.

After a few days of driving, I arrived at the Torrington State Conservation Area situated in the rolling granite hills of northern New South Wales. I was in unfamiliar territory and with that came the excitement of new carnivorous plant species. With really no direction as to where to go, I decided to drive down a rural road that looped back into a remote section of the wilderness, hoping to find some cool discoveries away from well-surveyed sites.

As the asphalt gave way to gravel, I noticed that the gutter was collecting water emanating from the gently sloping hillside. I pushed my way through the bushes onto a large slab of granite where the groundwater was forced out of the surface to form a seepage. Amazing displays of *Utricularia dichotoma* subsp. *fontana* (Fig. 1 left) lined the cracks in the rock, their vivid purple blooms exuding a luxurious aura in the balmy midday sun. This subspecies was new to me, their small corolla lips, backwards-pointed spur, and preference for terrestrial gravels were markedly different to the



Figure 1: *Utricularia dichotoma* subsp. *fontana* (left); *Utricularia brennanii* (right).



southern taxa I was familiar with. As I lowered myself to take pictures, a flash of orange caught my eye... It couldn't be – could it?

Amongst the field of purple was an oddly shaped flower with rusty orange back. A pink face and two golden dots near the centre were peering through the half-opened bloom. I had found the first ever sighting of *Utricularia brennanii* (Fig. 1 right) in the state of New South Wales! This taxon is typically associated with the wet heathlands of tropical Australia and its presence in such a southerly location was completely unexpected. I was buoyed by such a significant discovery so early in the trip and was eager to find more!

Not long after crossing the state border into Queensland, I was forced to stay put for three days after a freak rain event flooded the roads all around me. Yet it was these challenges that made my carnivorous plant discoveries just that bit more rewarding - kilometres of bush-bashing to see giant pink-flowered *Drosera binata*, battling an army of leeches to find *D. schizandra* (Fig. 2) deep in the rainforest, risking attacks from dagger-footed cassowaries to see *D. prolifera* in the unmarked wilderness. Each thrill only made me thirstier for the next adventure as I slowly journeyed up the coast.



Figure 2: *Drosera schizandra*.

After a month into the trip, I finally made it to the Atherton Tablelands. Situated in the monsoonal tropics of Far North Queensland, the region experiences months of rain followed by dryness. It is during the transitional weeks between the wet and dry seasons that the bladderworts come to bloom and the sundews are at full maturity. Turning onto the dirt road through the ranges, my car kicked up a large cloud of parched bulldust as I wondered whether I had arrived too late and if the plants had dried up already. In addition to the lack of water, I was apprehensive about the capability of my Subaru Forester off the tarmac, a bit intimidated by the large 4-wheel-drives that everyone else seemed to drive.

I was encouraged when I dipped into a valley and noticed a tiny creek line that was still flowing. After following the water upstream, I was led into a deeply eroded gully carved into the landscape during wetter periods. Groundwater seeped out from the walls on either side of me, creating the perfect habitat for an enormous population of carnivorous plants. Hundreds of *Drosera serpens* (Fig. 3 left) glowed in the wet clay, catching the light with their long, spider-like arms. Colourful rosettes of *D. burmannii* glistened like a field of gemstones while abundant amounts of *U. bifida* littered the creek like yellow confetti.

The gully gradually flattened out and as I clambered over a final embankment, I looked up and found myself in the midst of a broad, green meadow of grasses dappled under a sparse canopy of *Eucalyptus*. In this gentle valley, deep humic soil collected water draining from the ranges, acting as a reservoir that supported a lush and serene environment amongst the harsh skeletal hills. I noticed purple flowers peeking out from the grasses and was surprised to find *Utricularia blackmanii* (Fig. 3 right)! Its blooms are most distinctive when viewed from the side, with the long spur thrust backwards at an obtuse angle relative to the front of the flower. I had searched far and wide for this species, driving hundreds of kilometres to sites that had long dried up but it was ultimately by chance that I found it.





Figure 3: *Drosera serpens* (left); *Utricularia blackmanii* (right).

After taking in the peace of the valley, I continued onward down the road, absolutely relieved that I had arrived just in time to find that elusive bladderwort. This sense of calmness abruptly dissipated as I was confronted by an unexpectedly wide creek crossing. I had never actually crossed a proper creek before and wasn't sure the car could handle it, but with a long drive back, I decided to face my fears and just go for it. I held my breath as I drove into the water, praying that the car would make it through. My heart skipped a beat as the tyres momentarily slipped on the sandy bottom of the creek! But the momentum pushed it forwards and I regained enough traction to pull the car up on the other side of the crossing.

Emboldened by the fact I didn't drown, I decided that now was the time to tackle the infamous Cape York Peninsula all the way to the very tip of the Australian continent. Either I'll make it or I'll die trying! Well, maybe not die but I certainly faced the prospect of a very expensive tow that I'm still not completely sure my insurance would have covered. Either way, the stakes were high and the risk excited me.

The first few hundred kilometres up the Peninsula were beautifully sealed and undulated between the gentle hills of the hinterland. Yet it was clear from the golden grass and dry creek beds that the inland tropical savannah had long dried up, so I detoured towards the coast to survey the wetter lowlands by the sea. After a day or so, I was once again in the midst of the sandy open heathlands which I knew always had a multitude of carnivorous plants.

There's a certain paradox in the field where plants in abundance can make you bored as you search for new discoveries. Such was the case for *Drosera petiolaris* - the species was basically anywhere with the slightest hint of water and their sheer abundance caused my eyes to glaze over them. Everything seemed to 'just' be *D. petiolaris* - mature plants, seedlings, big rosettes, compact rosettes, plants with stems ... hang on - a stem? How strange... In the back of my mind, I vaguely remembered a newly described sundew, so I took some reference shots and drove up a hill to get phone reception and downloaded the scientific paper.

My heart began to race as I glanced back and forth between the paper and my camera. I couldn't believe it - I had found *Drosera stipularis* (Fig. 4)! This rare woolly sundew is distinguished by its diminutive rosettes that grow at the end of an elevated stem of accumulated foliage and is named for the prominent stipules that emerge from the centre of the plant. I thought it had a rather uncanny resemblance to a pygmy sundew, a remarkable example of convergent evolution where such adaptations allow the tiny plants to persist above the ever-shifting sands of their environmental niche.

Although the sand was deep, the groundwater accumulated during the wet season forms a network of persistent swamps in the dips between the dunes. Most of these had the typical selection of tiny but common bladderworts such as *Utricularia nivea*, *U. quinquedentata* and *U. minutissima*.



- nothing out of the ordinary, but you never know what might present itself at the next site. As I came to another swamp, I quickly glanced into the tannin-stained waters and saw an unfamiliar white bloom. The flower was small, with a flared petal and inflated flower stalk. No way... Was this the legendary *U. albiflora*?

*Utricularia albiflora* (Fig. 5) was one of the first Australian bladderworts ever described to Western science, with a collection made during Cook's original voyage. It was then lost and misidentified for over 200 years before it was recently rediscovered. With only a handful of people ever seeing the plant, this would make it the rarest bladderwort I've ever found!

I was practically dancing as I photographed this extremely rare plant around the periphery of the swamp. It was then that something equally spectacular caught my eye. A strange flower with long antennae-like projections vibrated in the breeze as if it were mimicking an insect. I stared in disbelief - I had found *Utricularia lowriei* (Fig. 6)! Within the space of an hour, I had sighted three of the world's most elusive carnivorous plants. I could only wonder what else Cape York was hiding.

As I penetrated further north into the Peninsula, the nicely graded highway soon gave way to a horrendous dirt road that was notorious for wrecking cars with its extreme conditions. Driving on heavily corrugated surfaces requires some speed to minimise the damage to the car, as well as sudden braking for the dust holes and washouts that seemed to appear out of nowhere. This was some of the most intense driving I've ever encountered and I surely



Figure 4: *Drosera stipularis*.

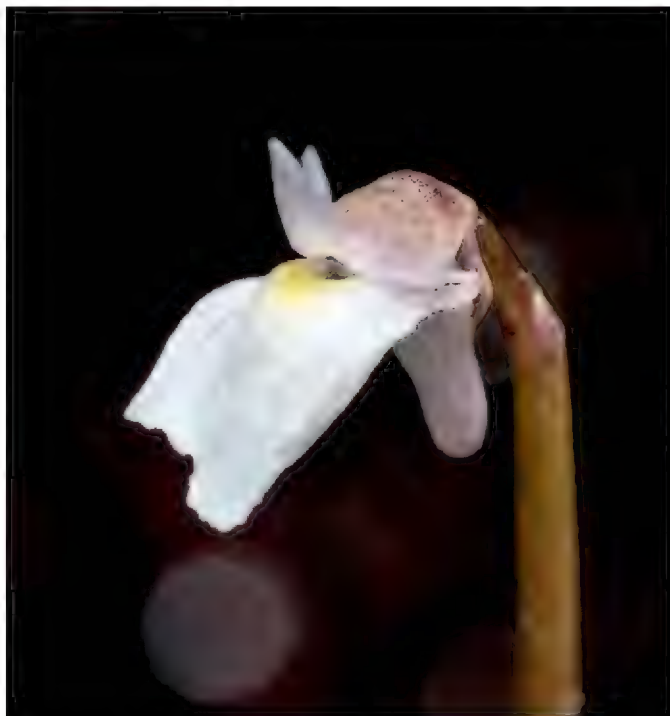


Figure 5: *Utricularia albiflora*.



Figure 6: *Utricularia lowriei*.





Figure 7: *Drosera petiolaris*, *Drosera serpens*, and *Nepenthes tenax* × *mirabilis*.

man-eating saltwater crocodiles. I hesitated as weighed up the odds but the vivacious red leaves of *Drosera spatulata* caught my eye and I was propelled forwards, clearly no better than an insect enticed by the glistening dew to its death.

As I ventured deeper into the swamp the pure white sandplain gave way to dark waterlogged loam. I tip-toed into the floodplain, doing my best to avoid stepping on carnivorous plants - a task that proved impossible as every square foot of available space was colonised by a sundew or bladderwort. With increasing trepidation as the puddles got deeper and the crocs got closer, I pushed forwards until the bushes of *Nepenthes tenax* × *mirabilis* resolved before me.

I was stunned by their upright pitchers that shone like beacons in the field, held proudly above the leaves by a stiff, coiled tendril. The hybrid vigour conferred by *N. mirabilis* bestowed an impressive size, with long vines that sprawled over the floodplain in all directions. Massive specimens of red *Drosera* aff. *serpens* scrambled through the tangle of pitcher plants using their spidery arms to climb upwards while otherworldly rosettes of *D. petiolaris* complemented the almost alien landscape (Figs. 7 & 8). I was in carnivorous plant heaven!

Eventually, late afternoon crept in and I returned to the car to drive to the campsite. I inserted the key and turned - Nothing happened... Nothing at all! My stomach dropped as I realised the corrugations must have taken their toll and that I was stuck. With the sun dipping low, I knew that it wouldn't be long until crocodiles emerged from the depths, attracted to the scent of a depleted car

pushed my poor little Forester to its limits. After three days, my knuckles were white from grasping the steering wheel as I approached the Jardine River.

With a few hours left in the day, I decided to drive down a small track to the floodplain of the river. The trail was a bit eroded but manageable and soon the forest opened up to a beautiful sunny expanse of swampland stretching far into the horizon. In the distance, I could just make out some bright green foliage that looked interesting but it was well within the territory of



Figure 8: *Nepenthes mirabilis* x *tenax* (left); *Drosera petiolaris* (right).





Figure 9: Cape York (left); Byblis liniflora (right).

battery, and I’d be forced to fight off dingoes that must have been stalking me, fully knowing that there was no phone reception! Perhaps it was the electric energy of all the carnivorous plants around me (or more likely a quick tightening of the terminals) but I somehow got the car started and successfully made it into town where it promptly died at the mechanic the next day.

With a new battery and my car problems behind me, I was now so close to my final destination. Nothing could stop me- not even that slightly dodgy creek crossing that I would have baulked at just a few days ago. With newfound confidence, I sped through the rainforest and pulled up at the Pajinka car park just a few hundred metres from the top of Cape York.

As I scrambled onto the rocky headland, I felt immense pride and elation as I joined the thousands of pilgrims that had made the legendary trip before me. After an obligatory selfie with ‘The Sign’ at the tip, I poked around the grasses on the headland where I was met with a final surprise - a *Byblis liniflora* growing in an unusually persistent seepage. After almost 2 months and over several thousand kilometres of driving, I finally found mainland Australia’s most northerly carnivorous plant!

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# NEW CULTIVARS

Keywords: cultivar, *Sarracenia* ‘Carolina Caramel’, *Sarracenia* ‘Arctique’, *Sarracenia* ‘Clafoutis’, *Sarracenia* ‘Patchwork’, *Sarracenia oreophila* ‘Patty Petzel’.  
<https://doi.org/10.55360/cpn521.cv521>

Abstract: Five new carnivorous plant cultivars are named and described: *Sarracenia* ‘Carolina Caramel’, *Sarracenia* ‘Arctique’, *Sarracenia* ‘Clafoutis’, *Sarracenia* ‘Patchwork’, *Sarracenia oreophila* ‘Patty Petzel’.

## *Sarracenia* ‘Carolina Caramel’

Submitted: 10 October 2022

I have grown this cultivar which I germinated from seed received from Orton Plantation, North Carolina, USA in the late 1990s. After twenty years or so, I finally selected this particular clone from a group of plants I still had and named it *Sarracenia* ‘Carolina Caramel’ (Fig. 1). It is a cross of *S. flava* var. *maxima* × *S. flava* var. *cuprea*. Both originated from the Carolinas.

The plant is distinguished by the beautiful soft colors and velvet-like appearance. The entire pitcher shows a typical pale *maxima*-green color, and the exterior of the hood is caramel-colored (*cuprea*) with green inverted veins. Later in the season, the hood turns a little darker and so the veins stand out more. Despite the modest colors, it is a striking plant, vigorous, up to 90 cm tall. The flowers are striking yellow, like in most *S. flava*’s.

*Sarracenia* ‘Carolina Caramel’ must be reproduced vegetatively to preserve the characteristics of the cultivar.

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Figure 1: *Sarracenia* ‘Carolina Caramel’.



*Sarracenia* 'Arctique'

Submitted: 3 November 2022

*Sarracenia* 'Arctique' (Fig. 2) is a result of my crossing between two nice *S. leucophylla*, one from location Russell Road and one from Alba. Plant produces many very white pitchers around 80 centimeters tall. In autumn the white color is very intense on the top of pitchers and on the lid.

I named this plant for the resemblance of the very white pitchers of the plant and the north pole region of the earth.

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Figure 2: *Sarracenia* 'Arctique'.



*Sarracenia* ‘Clafoutis’

Submitted: 3 November 2022

*Sarracenia* ‘Clafoutis’ (Fig. 3) is a result of my crossing between two impressive plants *Sarracenia* ‘Giant Cotton’ and *S. moorei* ‘Leah Wilkerson’. The plant produces pitchers 70 to 80 centimeters tall with a red splotch. The red spot distinguishes it from *S. ‘Giant Cotton’* which strongly resembles a giant *S. leucophylla*. Also, the color is whiter than the *S. moorei* ‘Leah Wilkerson’.

The opening of the pitcher is rounded with a smaller lid in comparison to size of the pitchers and there is good veining on the top. The plant grows very well in spring and again in autumn. The plant turns more purple at the end of autumn.

I named this plant with similar colors with a famous French pastry.

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Figure 3: *Sarracenia* ‘Clafoutis’.



*Sarracenia* 'Patchwork'

Submitted: 3 November 2022

*Sarracenia* 'Patchwork' (Fig. 4) is a result of my crossing but I don't know the parentage. Plant resulted from my mixed seeds. I selected this plant firstly because of its vigor. The plant produces a large number of pitchers all around the season. Pitchers are really dark red with an almost black lip in summer/autumn. The hood is partly white with red veins. The pitchers are about 80 centimeters tall.

I named this plant Patchwork for the different contrast on pitchers.

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Figure 4: *Sarracenia* 'Patchwork'.



Submitted: 19 November 2022

This cultivar of *Sarracenia oreophila* var. *ornata* is a superb representation of a cherished, yet endangered species. *Sarracenia oreophila* ‘Patty Petzel’ is noteworthy for its yellowish-green colored leaves and deep reticulated magenta colored veining along the height of the late season pitchers (Fig. 5A); as well as a broad, red colored nectar roll and a deep red throat (Fig. 5B). This cultivar is of the Sand Mountain complex and has the typical netted, reticulate venation. As with most *S. oreophila*, this cultivar produces leaves and blooms early in the spring with pale green flowers. Recurved winter phyllodia are also produced during the later seasons. The early season pitchers are green with thin black, pinstriped veining. Under optimal conditions of maximum amount of sunlight, this specimen may produce much larger, stout, and ornately colored late season pitchers capable of reaching 40 cm in height. To maintain the unique colors and characteristics of this cultivar, vegetative propagation is required.

*Sarracenia oreophila* ‘Patty Petzel’ originated as seed grown by Carson Trexler of Portland, Oregon and was obtained by Robbie McDougal of Eugene, Oregon. Robbie McDougal graciously gave me divisions of all his *Sarracenia oreophila* in April of 2022 and is currently the only other person besides myself to own this cultivar.

This cultivar is named in honor of Patty Petzel, a long time International Carnivorous Plant Society (ICPS) member and avid *Sarracenia* collector. Patty first joined the ICPS mid 1980s and has been silently supporting the ICPS for many years through small donations. Patty has been growing carnivorous plants since her high school days, but officially began to collect *Sarracenia* in mass during the late 1980s. She works at Linn-Benton Community College, Albany, Oregon, where she has influenced many undergraduate students — not unlike myself — to grow carnivorous plants by giving them their first *Sarracenia*.

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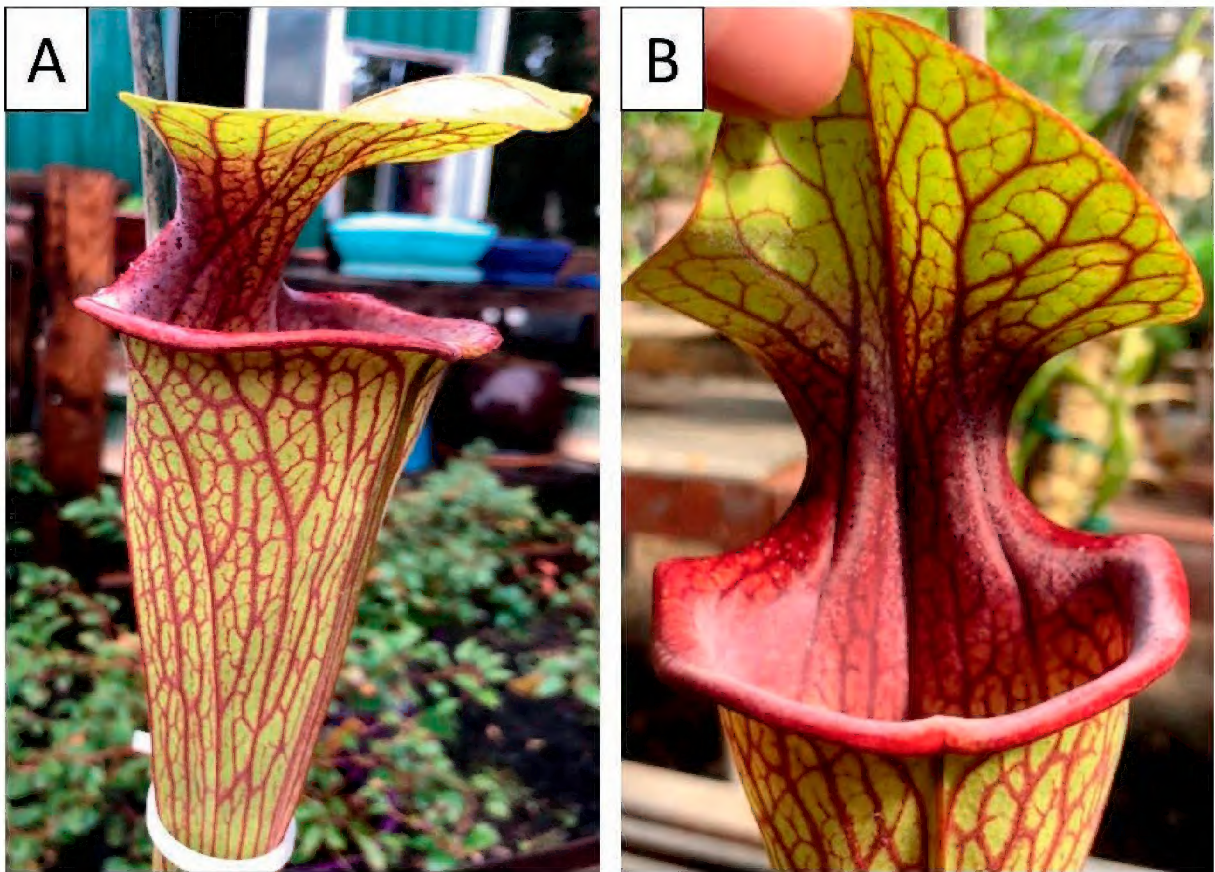


Figure 5: *Sarracenia oreophila* ‘Patty Petzel’. A) late season pitcher showing the colors of the leaf. B) close up of the nectar roll, throat, and hood.



